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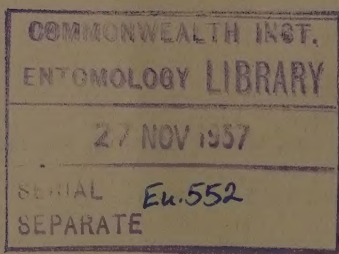
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Indexer, R. D. Weal.

All communications to the Editor, 22 Harlington Road East, Feltham, Middlesex, England. Telephone Feltham 3740.

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NEWS AND VIEWS

The death of Dr. E. A. Cockayne, O.B.E., D.M., F.R.C.P., F.R.E.S., on 28th November, 1956, deprived us of a staunch supporter. Although he did not join the editorial panel until October 1955, he was a tower of strength during the period immediately prior to the issue of the first number and gave freely of wise and valuable advice during the early days of publication.

We are pleased to announce that Dr. H. B. D. Kettlewell, M.A., M.B., B.Chir., F.R.E.S., has consented to serve on the editorial panel. Apart from the direct services he will give to the *Gazette*, Dr. Kettlewell's attachment to us will serve to continue our association with the Rothschild-Cockayne-Kettlewell collection of British Macrolepidoptera at Tring. We hope that the death of Dr. Cockayne will in no way affect or diminish the scale of the generous gifts of exceptional and interesting specimens given to this national collection by private collectors.

Mr. A. L. Goodson, of the Zoological Museum, Tring, Herts. (part of the British Museum, Natural History), who has so faithfully and well performed the office of Curator of this collection since its foundation, will be interested at all times to hear of, or see, any specimens which collectors deem of interest.

No British naturalist should omit to read the *Report of the Nature Conservancy for the year ended 30th September, 1956*. This 82-page publication, illustrated by 12 plates, is full of information of interest. It is published by the Stationery Office, price 4s. 6d., and is obtainable direct from H.M.S.O., Kingsway, London, or from any bookseller.

In this number we have pleasure in presenting an important paper by Mr. F. G. A. M. Smit. This paper is essentially a supplement to the Royal Entomological Society's *Handbooks for the Identification of British Insects*, Vol. 1, part 16. *Siphonaptera*, which will appear later this year.

We thank Mr. Smit for a contribution towards the costs of publication of his paper, which has enabled us to increase the number of pages in this issue.

Binding. Binding of the volume for 1956, or for any previous volumes can still be undertaken. The standard binding is in dark blue cloth, but any other style can be followed. The cost per volume for binding in normal style is 12s. 6d. Volumes for binding should be sent to the Editor.

BOOK REVIEW

A Revised Key to the British Water Bugs (Hemiptera-Heteroptera) with notes on their Ecology, by T. T. Macan. 1956. Pp. 74, 48 text figs. (many compound). Scientific Publication No. 16, Freshwater Biological Association, Westmorland. Price to non-members 4s.

As Dr. Macan's Key to the British species of Corixidae, 1939 (Scientific Publication No. 1) and Key to the British Water Bugs excluding Corixidae, 1941 (Scientific Publication No. 4) have been out of print for some time, this volume will be regarded as doubly welcome by all freshwater biologists.

Although in the main a reprint from the author's combined 1939 and 1941 works, the opportunity has been taken to bring the nomenclature up to date, to improve where necessary the Keys and to redraw and re-arrange a small proportion of the illustrations.

About half a page is devoted to details on the killing, preservation and examination of specimens, then follows a Key to the families, a representative species of each being illustrated. Keys to genera and species are divided into two parts; families whose species are surface dwellers and those which are essentially aquatic. Considerable detail is contained in the Keys which are further enhanced by profuse and excellent line illustrations.

Nine pages are devoted to ecological notes; four pages of references and an index complete the volume. Both the Association and author have reason to be pleased with this latest addition to an already popular and respected series of publications.

A.E.G.

THE HISTORY AND STATUS OF
SPAELOTIS RAVIDA (SCHIFFERMUELLER)
THE STOUT DART IN BRITAIN
(LEP: CARADRINIDAE)

By R. F. BRETHERTON, C.B., M.A., F.R.E.S.

My acquaintance with this species in the flesh is limited to a single example caught on 29th June, 1939, at sugar in Hen Wood, Boars Hill, on the North Berkshire edge of Oxford. I missed a second, unless it was *Graphiphora augur* (F.). Since that night I have never seen *S. ravida* alive. Inquiries as to why this should be revealed first, that it has become very rare of recent years and, second, that its previous history and distribution in Britain are of a very unusual pattern, which seems well worth analysis and interpretation.

The Stout Dart seems to have been first presented as a British insect by Haworth in 1803 (*Lepidoptera Britannica*, p. 220). But, though his description fits *S. ravida* well enough, he identified it with Hübner's *Noctua crassa*, a common European species which has since been once or twice doubtfully reported from Britain. Haworth said that the Stout Dart inhabited Norfolk, appearing in gardens in August: it had been notified to him by its captor, the Reverend J. Burrell, and he had seen only very few examples. Stephens (*Haustellata*, 2:131), after quoting Haworth's description but querying his identification of it with *N. crassa*, said it was 'far from common, not near London, but in Norfolk and Scotland, in August, frequenting gardens'. He added Bottisham (Rev. L. Jenyns) and Netley, Salop (Rev. W. Hope). It was left to Doubleday in 1842 (*Ent.* 1:377) to make the firm equation between the Stout Dart and the *ravida* of Hübner; in 1859 he traced this further back to Schiffermüller's *Wiener Verzeichnis* of 1776. (*The Zoologist Synonymic List of British Butterflies and Moths*.) The species has been generally called by that name since, though for some years *obscura* Brahm (1790) was thought to have priority and was, in fact, popularised to British collectors by South in 1907 (*The Moths of the British Isles*, 1:215). This was unfortunate: for it has led to some confusion in the records with *Apamea obscura* Haworth = *gemina* Hübner (The Dusky Brocade).

There was a great growth of interest in collecting in England soon after 1850, and the moth became fairly widely known. Stainton in 1857 in his *Manual* quoted a Continental description of the larva, and reported the moth as occurring at Burton-on-Trent, Cambridge (common), Darlington (common), Edinburgh, Halton (Bucks), Scarborough (abundant), Stowmarket, Worcester, and York (common),

in July and August. In 1865 Buckler reared larvae and provided a description of their habits and appearance (*Ent. mon. Mag.* 2:115). This was reproduced without change in 1893 in the fifth volume of his *Larvae of the British Butterflies and Moths*, and, so far as I know, no one has been able to add to it right down to the present day. In 1870 Edward Newman in his *Illustrated Natural History of British Moths* gave the moth a wide distribution: 'Devonshire (Alphington and Torquay), Dorset (by Mr. Dale), (this is probably a mistake), Kent, Essex, Norfolk, Suffolk, and in nearly all midland and northern counties, extending even to Scotland.' F. O. Morris in 1872 added a few more localities. But it was left to Barrett in 1896 (*The Lepidoptera of the British Isles*. 3:386-8) to give the fullest account of the moth which we yet possess. Of its habits and distribution he says:

'On the wing during the latter half of July and in August The moth hides in the day-time in old thatch or among herbage on the ground. Flies at dusk and readily comes to sugar Of very uncertain occurrence, and sometimes hardly observed for years. From 1868 to 1872 it was common in some of its haunts; by 1891 it had come to be looked upon as a very rare insect; it then reappeared, and for the last four years (i.e. 1892-5) has, in some districts, been common. Found throughout the Southern Counties, and in Kent and Wilts., sometimes commonly, as also in the Reading District of Berks; rare in Devon and apparently not noticed in Cornwall. In Essex, abundant in 1894, and found also in Suffolk and Norfolk; generally distributed over the fen and chalk districts of Cambs., and adjoining counties, and there also plentiful in its favoured seasons, when indeed it has been known in the suburbs of London; taken occasionally on the Cotswolds, in Leicestershire, Derbyshire, Herefordshire, and more rarely in Lancs., and Yorks.; more frequently in Lincs., and Durham. In Scotland, very rare (Ayrshire, Clyde, Solway, Forth). The only record for Ireland is doubtful. Abroad, its range is extremely wide: Central Europe and all temperate portions of the northern part of the Continent. . . .'

Accounts of the species in all later general works are but abbreviations or paraphrases of Barrett. To add anything one has to delve for scraps of information in periodicals and local lists, in collections, and in the memories of one's friends.

Barrett put his finger on two of the most striking features of the moth's history in Britain—very wide and scattered distribution and irregularity and uncertainty of appearance. His account of the first is, however, a little misleading. It is true that the moth has been reported at some time or other in every English county except Westmorland, Cornwall and Sussex, as well as at Barmouth in North Wales and at a few places in Scotland. But over most of this range its recorded appearance has been no more than casual: one or two

examples here and there in single or widely separated years. This is true of the South Coast, with a mere half-dozen records in all; of Scotland and Wales; of Northumberland, Cumberland, Lancashire, Cheshire and the western Midlands; and of coastal Norfolk and Suffolk. Nevertheless, there remain a number of places scattered over a large stretch of northern, eastern, and south midland England, where there are good indications that the moth has been resident for at least several successive years. On the sketch-map attached a distinction is made between casual and recurrent records, and also between those which date entirely from before 1919 and those which are subsequent to that year. Records and specimens are also given in full in the Appendix.

The most continuous history and the greatest concentration of reports is for the Cambridgeshire and Huntingdonshire Fens. At Cambridge itself *S. rorida* was recorded before 1857 as quite common, and it was taken again in the three years 1892 to 1894. In Wicken Fen it was taken by G. T. Porritt in 1878, and in 1891 J. W. Tutt reported its reappearance in early August after, apparently, some years of scarcity or absence. Thereafter, there are definite records for 1892/7, 1905, 1908, 1920, 1922, 1935 and 1936. In the 'nineties it was certainly regarded as a 'regular' at Wicken: it frequented particularly the lane just above the fen, where it used to come to sugar along with those other lost species, *Apatele strigosa* (Schiff.) and *Trachea atriplicis* (L.), which were, however, much rarer. In the Chatteris district J. C. Fryer wrote (*Ent.* 47:299) that it was quite common from 1876 to 1903, but then became very scarce; but it was taken in small numbers annually in the Huntingdonshire Fens and at Monks Wood from 1904 to 1911, and again at Monks Wood and Woodwalton Fen in 1938 and 1939, near Huntingdon in 1941, and at St. Neots in 1942. It seems also to have been frequently caught near Peterborough.

Further north, there are many references to the moth in Lincolnshire, mostly before 1912 (G. W. Mason, *The Lepidoptera of Lincolnshire, Pt. I*, 1907), but including the capture of one at Lincoln on 30th July, 1939, and one at Boston on 9th August, 1946. These refer mostly to places where the chalk hills come down to the fenny plain, but some are coastal. It was said to be very common at Haverholme Priory in 1905, and there are specimens from there in the Cockayne/Kettlewell collection at Tring dated 1906, 1908 and 1911 as well. There is definite evidence of recurrence at Market Rasen for the three years 1895 to 1897, and at Panton in 1894 and 1895. In north Leicestershire and the Sherwood Forest district of Nottinghamshire it also seems to have had more than casual status about 1904, though few exact details are available.

North of the Humber it has been reported at many places on or near the coasts of Yorkshire and Durham, and there are single records well inland. At Hull one was taken in 1891, several in 1893, and

100 in 1894. At Spurn Head and at Scarborough it was said to be sometimes abundant before 1883, and there is a specimen at Oxford from the former place dated 1903. At Hartlepool one or two were taken nearly every autumn for some years before 1899, and there are some now at Tring dated 1907 and 1908. It was recorded from Saltburn in 1891 and 1892, at Sunderland in 1891, and in some numbers at sugar and between window shutters at South Shields. Clearly the moth was well established in those parts about the turn of the century, but I have found no trace of its presence there in recent times.

Another well-known haunt of *S. ravidus* was the Thames-side marshes of Essex, where the Rev. C. R. N. Burrowes gave several accounts of it between 1894 and 1907. (*Ent. Rec.* 5:204, 284; 7:65; 14:285.) In the former year he met with it 'in swarms' at sugar round his garden at Rainham. It began on 5th June and went on until 6th September. By that time he was heartily tired of it: he had taken about 120, and 'how many my cat ate I know not'. In 1895 he 'welcomed it again, though not in such numbers as before'. In 1902, when he took 8 or 9 at Mucking, he said that it was 'more than usually common', though he had had one or two each year in the marshes since his great take at Rainham. In 1907 he reported the capture of 12 at Mucking in late August and September. I can find no later records for these marshes, but they have probably not been seriously worked at night since Burrowes' time. Just across the river, above the Kentish shore, besides a number of old records, it has been reported at Grove Park in 1948, and at Pinden by Mr. E. J. Hare in 1942, 1945, 1946 (singly) and 1949 (three). There are also indications that in good years the moth spread inland from the Essex marshes along the valleys of the Lea and Roding. One taken by Doubleday at Epping in 1847, now in the Dale Collection at Oxford, may well be the oldest British specimen now existing; and the species was taken there again in 1855, 1894 and 1935. Odd specimens taken at Ongar Park Wood, Romford, Crouch End and Hale End, in 1894, at various places in south Hertfordshire about the same date, and at Loughton in 1936, may have come from the same dispersal area. (C. G. de Worms, *The Moths of London and its Surroundings*, 1954.)

There is also evidence of residence of *S. ravidus* in recent times in the country round Bishop's Stortford, on the borders of North Hertfordshire and north-west Essex. Here it was taken at Stansted in 1875, commonly, but then only very occasionally until 1936. In that year it appeared abundantly at Manuden and Stortford from the end of June until the end of August, and also at Little Hadham (*Trans. Bishop's Stortford Nat. Hist. Soc.*, 1950) and some miles away at Great Yeldham. It apparently persisted for some time, as it was found at Stortford at sugar in both 1938 and 1940. The scene of the most recent British capture, made at mercury vapour light at Balsham on

1st July, 1955, is not far away, over the Cambridgeshire border. All these places are in chalk country, but it is possible that the population of the moth there is replenished from time to time by movements from the fens a little to the north.

Another arm of the moth's distribution apparently extended across the Chilterns and Cotswolds to the Severn Valley. In 1891 A. J. Spiller, who had previously met with the moth in Essex, took six at sugar at Chinnor under the western face of the Chilterns—five on the hillside and one in his garden. Next year he got 50, some at sugar, but mostly hiding in outhouses. In 1893 (an exceptionally early season) *S. ravidia* 'first appeared on 25th May and on 3rd June was quite common. Altogether I and my lads captured 200. A second brood appeared in August, but was less numerous.' (*Ent. Rec.* 5:52.) In the same year it was abundant at Halton, just over the Buckinghamshire border, many being taken at lime blossom; and in 1900 at least one was caught a little further north at Tring. There are a number of other records for this period for the Oxfordshire Chilterns right down to the outskirts of Reading; and further west, on the Oxford Heights, one was caught in Bagley Wood in 1888 and at least twelve in 1896, and there are rather later records from Radley and Abingdon. The moth reappeared in this same general area after the first World War. It was taken at Kingsey, near Thame, in 1921, in large numbers at Shillingford in 1922, singly in Bagley Wood in 1922 and 1923, near Faringdon in 1922, and at Holton Pits, east of Oxford, in 1927. In 1939, besides my own capture on Boars Hill, one was caught a few days later in marshy ground two miles away at Cothill, and some in north Oxfordshire near Banbury. Even more recently, it recurred at Tring in 1941 and Aston Hills, nearby, in 1945; and Mr. R. C. Edwards tells me that in mid-July, 1944, having found one trapped in his car, he examined the windows of his garage and outhouses at Woburn Sands and took over a dozen as they were fluttering at dusk. At Tysoe, in south Warwickshire, Mr. Trevor Trought obtained two in July and August, 1947; one of these was bred, but unfortunately it is not known how the larva or pupa was found.

In the Gloucestershire Cotswolds there are several scattered early records of *S. ravidia*, and it appeared in successive years at Coxhorne near Cheltenham in 1895 and 1896 and a few miles away at Birdlip and Kimberland in 1897. This latter locality is a piece of ancient bog in front of the western escarpment; and it is interesting to see that here, as at Wicken Fen, the species was taken along with *A. strigosa*; and this association was repeated at the edge of a reclaimed fen at Castle Moreton, near Tewkesbury, where *S. ravidia* was found regularly for at least ten years about 1895. But the most striking Gloucestershire records come from Bourton-on-the-Water. Here several were taken by Donovan between 1930 and 1940, and Mr. A. G. Tayler obtained it in 1943 (2), 1944 (2), 1945 (3) at sugar and buddleia blossom, and

1954 (1) at light. He tells me that, though he has collected over a wide area round Bourton, he has seen the species only in his own garden. It is clearly not common there; but it seems almost certain that it persisted for twenty years at least.

South of the Thames Valley reports of *S. ravida* are very few, except in Wiltshire. In 1892 it appeared near the northern border on 21st July and came to sugar pretty freely for three nights following. It was also reported from Calne about this time. From Marlborough there are specimens in the Hope Collection at Oxford dated 1892, 1893 and 1894, and it was seen there again in 1912. It reappeared in the county in 1943, when a few were found in houses at Salisbury, and some were taken at Micheldever, on the Hampshire chalk, in 1944. But I have found no evidence of its presence during the intervening years.

These accounts show that *Spaelotis ravida* can inhabit several kinds of terrain. Its chief preference seems to be for the edges of marshland, as in south Essex, the Fens, and most of its haunts in Lincolnshire and the Severn Valley. But it can also establish itself on well-drained slopes on chalk and oolite, as in the Chilterns, north Berkshire, the Cotswolds, Wiltshire, and the north Hertfordshire and Essex borders. In Yorkshire and Durham it apparently frequented coastal districts, not necessarily marshy. The most striking habit of the moth, commented on by several writers, is its disposition to seek out houses and lofts as a resting place in the daytime: quite a large proportion of those in British collections have been got from this source. Even more have been taken at sugar, to which they come early in the evening and feed quietly. Many have also been found on flowers of valerian and buddleia, and at lime blossom and honeydew. Captures at light were recorded as early as 1865, but have been relatively few: probably this only reflects the fact that the moth has been very rare in the last ten years, when the use of mercury vapour and other powerful lamps in out-of-the-way places has become popular. In that period most of the small number taken have in fact been secured by this means.

Nothing is recorded with certainty about the earlier stages of *Spaelotis ravida* under natural conditions in Britain. Before describing the larva Buckler wrote: 'By the kind efforts of Mr. Doubleday . . . I have reared and figured larvae of this species. They are to be found in soils congenial for their burrowing, just below the surface, chiefly at the roots of thistles and dandelion, being full fed from the beginning to 20th May. I found they feed freely on large milky leaves of dandelion and change to pupae in loosely constructed cocoons of earth from 6th to 20th May. . . Moths appeared on 8th July, 1865.' (*Ent. mon. Mag.* 2:115.) The language is cautious and ambiguous. It is not clear that either he or Doubleday had found the larvae *in the wild*: indeed, most of the account clearly refers to their behaviour in captivity. Since he went on to describe three colour

forms of the larvae, he probably had a good many of them at once, which rather suggests that they had been bred from eggs. But, if so, he was more successful than anyone since his time. There are in the periodicals several mentions of eggs having been obtained, but no other account of successful rearing. C. R. N. Burrowes says that in September, 1894, after several failures, he obtained some eggs; but, though many of them turned black, they did not hatch. A. V. Hedges (*Proc. S. Lond. ent. nat. Hist. Soc.*, 1947/8:74) writes: '*S. ravidia* I have found so far to be the most difficult and uncertain of all the Agrotids. On several occasions I have taken females between 11th and 26th July, and in some cases they have commenced egg-laying from 6th September and others 2nd October, but the ova have always been infertile. On one occasion I kept two female *ravidia* from July until Christmas, when they laid three or four infertile ova. . . . Mr. Hawkins found *A. ipsilon* pairing in early November one year, after which laying hundreds of eggs. This may possibly be a clue to *ravidia*'s early life history, as although they fly in July they may not pair until autumn or early winter.' This is likely enough. All the records show that the moth is about over a very long period, and its habit of seeking shelter in lofts and outhouses suggests that it 'æstivates' for part of that time. Probably eggs are not developed until late in its life. My own specimen, caught at the end of June, is a female in fresh condition; but its abdomen collapsed and shrivelled on the setting board. But on occasions there may be more rapid development, for Spiller definitely says that, after the exceptionally early emergence in May, 1893, there was a second brood later. I am told that in the Fens larvae have been found on the ground under foliage and 'bred through; but, if so, the circumstances do not seem to have been recorded. Several writers from Stainton onwards mention dock, as well as Buckler's dandelion, as a food-plant; but this seems to be based on Continental rather than British experience. It is clear that the life history of the species in the wild presents one of the unsolved problems of the British lepidoptera.

Study of additional and later material confirms Barrett's remarks about the irregularity of appearance of *S. ravidia*. I have found definite evidence of its occurrence in over 60 of the 101 years from 1855 to 1955, but the records are very unevenly distributed over the period and also differ greatly in number between the years. There are indications of at least six cycles from abundance to scarcity. The species was clearly common in the Eighteen Fifties, 1855 being a particularly good year; but I have found no records of it in the five years 1860 to 1864. We have Barrett's word that it was common from 1868 to 1872 (though this does not appear very clearly from the published records), and it is mentioned in 1874 (Brandon, Suffolk) and 1875 (Stansted, N.W. Essex); in the next fourteen years, to 1889, I have traced it only in 1878 (Wicken, Cambs.), 1884

(King's Lynn, Norfolk), 1886 (Spurn, Yorkshire), and 1888 (Essex and N. Berkshire). In 1890 it was taken oddly in Hants, and Warwickshire. In 1891 it reappeared in several places, was commoner and more widespread in 1892, and reached its greatest numbers and widest distribution in 1893 and 1894. After being fairly common and widespread in 1895 and 1896, it then apparently declined, and I have found no records at all for 1899 and only a few in the first years of the new century. There was then a recovery which may have reached its peak in 1905 or 1908, followed by a further decline to a complete gap from 1913 to 1919 inclusive: this was, indeed, a period of declining interest in collecting and interrupted by war, but the total lack of reports must surely indicate that the species was, at best, very scarce. It reappeared for the four years 1920 to 1923, and in 1922 seems to have been numerous, though much less widespread than in the Eighteen Nineties; but there is then another gap, interrupted only by a single capture near Oxford in 1927, from 1924 to 1934. In 1935 it was reported again from several places, and 1936 was definitely a good year for it; thereafter, except for 1937, there are annual mentions until 1949, but these became casual after 1945. Since 1949 I know of only four captures, one in 1953 (Stanmore, Middlesex), two in 1954, and one in 1955 (Balsham, Cambs.). It is noticeable that its range in recent times seems to have been more restricted than during its previous good periods: notably, we have no records since 1919 from its earlier haunts north of the Humber, and only two from Lincolnshire, though casual records from Cumberland, Lancashire and Cheshire break new ground.

How are these remarkable fluctuations in range and numbers to be interpreted? *S. rorida* is often called a migrant; and the many isolated records and sudden appearances show that it must have a wandering disposition. But neither the distribution nor the timing of its appearance resemble those of species whose presence in Britain is due to annual immigrations from the Continent. The many cases of recurrence for several years in the same places seem to be decisive against the idea that its presence can be due mainly to this cause; and so is the fact that its 'good' years, such as 1893 and 1894, 1905, 1922, 1936, were preceded by one or two seasons in which its numbers seemed to be building up, and were followed by periods of fairly even decline. The 'good' years were, indeed, also those which yielded most of the casual records far outside its normal British range; but it looks as if these represent dispersal from its British centres rather than the arrival of immigrants. Its Continental distribution also tells against the view that annual migration can have much to do with its abundance or scarcity in Britain. It seems to be mainly an inland Central and Eastern European species. In France, though L'Homme (*Catalogue des Lépidoptères de France et de Belgique*, 1923/35) says that it is general ('partout'), he in fact mentions in a long list of localities none nearer the Channel than

Douai. In Belgium it is said to be rare; and Lempke (*Proc. S. Lond. ent. nat. Hist. Soc.* 1948/9:158) said that not a single specimen had been observed in the eight years for which migration records had been kept in Holland. In Denmark it appears to occur as in England, in very varying strength. It therefore does not seem likely to be a very frequent migrant to Britain, though occasional long-distance movements cannot be excluded, and the handful of records from the South Coast, and possibly from Suffolk and Norfolk, may be most easily explained as traces of immigration.

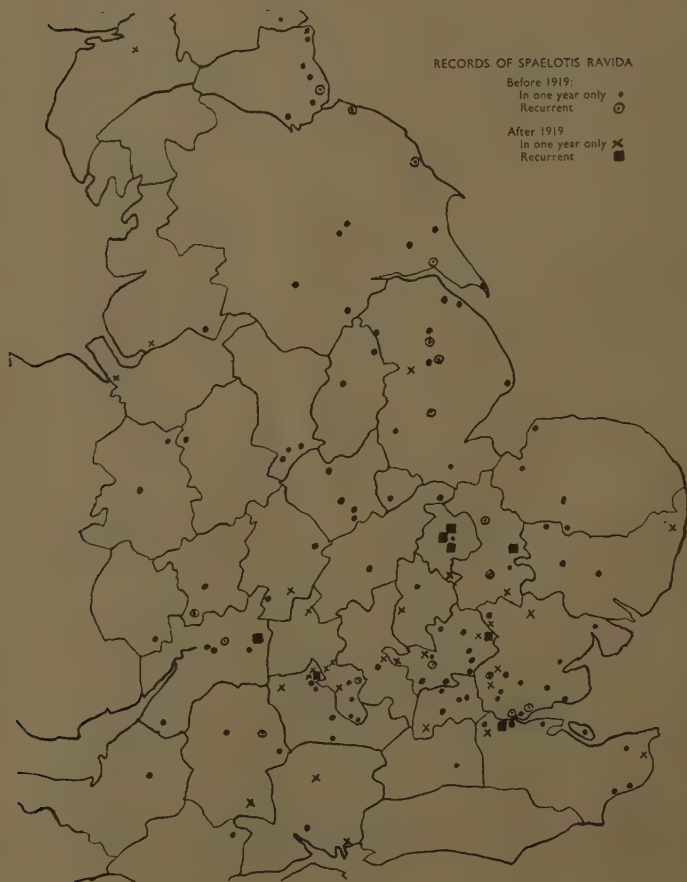
An explanation which fits the facts rather better is that *Spaelotis ravida* is a 'settler' species in Britain. On this basis most of the population would be British-born for several generations, but the species would depend in Britain on the arrival of occasional waves of immigrants. These would form colonies capable of expanding their numbers and distribution for some years, but destined to later decline and ultimate extinction in the absence of further reinforcements from abroad. Other species which have been from time to time on the British list, such as *Trigonophora empyrea* (Hübner) (= *flammea* (Esp.)), *Celama aerugula* (Hübner) (= *centonalis* (Hübner)), *Catocala fraxini* L., and *Aplasta ononaria* (Fuessly) probably fit this pattern, though admittedly their distribution has been at no time as wide as that of *Spaelotis ravida* (Bretherton, *Ent. Gaz.* 2:229/235). The latter's close relatives, *Agrotis ipsilon* (Rott.) and *Peridroma porphyrea* (Schiff.) (*saucia* Hübner), are probably also incapable of maintaining themselves in Britain without frequent reinforcement from abroad.

Finally, it is possible that *Spaelotis ravida* is a permanent but rather unhappy resident, existing normally at low density in a few widely scattered but suitable localities, but having the power of building up its numbers greatly at irregular intervals and then dispersing widely and making new more or less permanent settlements. It would then provide an extreme case of the pattern shown by, for instance, *Polygonia c-album* (L.) and *Limenitis camilla* (L.) among the butterflies. But an insect liable to such extreme fluctuations of numbers and range is likely to be vulnerable if it inhabits an island: there must always be the risk that one of periods of decline may carry it over the border to extinction, and this risk becomes greater if, as is happening in Britain to-day, drainage and cultivation are steadily reducing some of the areas previously most suitable for it.

I do not think that the evidence so far available justifies a firm choice between the status of 'settler' or of 'unhappy resident': nor, indeed, over a long period, are they mutually exclusive. It is clear that at the present time the species is at a very low ebb in Britain; but there have been just enough records during the past five years to show that it is not extinct and to suggest that its case is no worse now than it was, for instance, between 1912 and 1919, when

there were no reports of it at all. We can reasonably expect that another revival of *Spaelotis ravida* will come. When it does, let us take prompt steps to clear up the mystery of its early life-history and to define its habitats more fully.

For ease of reference, a summary of the records and specimens of *S. ravida* is attached, so far as I have been able to trace them. The list is certainly very far from complete; and it would be most helpful for our knowledge of the insect if any readers who can add



to it would let me have their information for possible future publication in a Supplement.

In conclusion, I wish to thank those gentlemen who have so kindly answered questions and otherwise have contributed material for this study: notably, Mr. R. C. Edwards, Dr. E. B. Ford, Mr. A. L. Goodson, Mr. E. J. Hare, Mr. Austin Richardson, Mr. A. G. Tayler, Mr. E. Taylor, Mr. Trevor Trought, and Baron de Worms.

*Ottershaw Cottage,
Chertsey, Surrey.
March, 1956.*

DATED EVIDENCE OF *SPAELOTIS RAVIDA* (SCHIFF.) IN BRITAIN

- 1841 ESSEX: Epping, 9.vii, 'the only one I ever saw here' (H. Doubleday, *Ent.* **1**:155—under name *crassa*).
- 1847 ESSEX: Epping, one viii (Doubleday, in Dale coll., O.U.M.).
- 1855 ESSEX: Epping; DURHAM: Darlington; YORKSHIRE: all in plenty (*Ent. Ann.* 1856:47). DURHAM: Castle Eden, viii (Sang, in *Cat. Lep. North. Durh. and Newcastle*).
- 1856 HUNTS: near Monks Wood, in plenty at sugar late vii (Sealey, *Ent. Weekly Intell.* **1**:149).
- 1858 Lincs: frequent at sugar on coast end vii (Gascoyne: *Ent. Weekly Intell.* **1**:149).
- 1859 RUTLAND: Uppingham (Bell: *Ent. Weekly Intell.* **6**:188).
- 1860 Lincs: Gainsborough (*Lep. Lincs.*).
- 1861/4 None found.
- 1865 WORCS: Powick, at sugar and light 14.vi (Hearder, *Ent. mon. Mag.* **2**:183, *Ent. Ann.* 1865:152). NORTHANTS: near Northampton, at light 8.vii (Horton: *Ent. Ann.* 1865:152).
- 1866 GLOS: Northleach (Todd, *Ent. mon. Mag.* **3**:210).
- 1867/9 None found; but Barrett says 'common in some of its haunts, 1868 to 1872'.
- 1870 HEREFORD: Leominster (Lucas, *Ent.* **6**:116).
- 1871/3 None found.
- 1874 SUFFOLK: Brandon, three (*Lep. Suff.*).
- 1875 ESSEX: Stansted, commonly (Spiller, *Ent.* **8**:281). CAMBS: Whittlesford, common at sugar and light (Thurnall, *Ent.* **9**:17). KENT: Chattenden, a fine series (Tugwell, *Ent.* **8**:292). YORKS: Beverley, one vii (Dobrée coll.).
- 1876/7 None found.
- 1878 CAMBS: Wicken Fen, not rare 22.vii/4.viii (Porritt, *Ent. mon. Mag.* **15**:111).
- 1879/83 None found.
- 1884 NORFOLK: King's Lynn, one at marram grass (Atmore, *Ent.* **18**:167).
- 1885 None found.

- 1886 YORKS: Spurn, three viii (Dobrée coll.).
- 1887 None found.
- 1888 ESSEX: about 60 at sugar (Spiller, *Ent.* **24**:247). BERKS: Bagley Wood, one 21.vii (A. Sidgwick, O.U.M.).
- 1889 None found.
- 1890 WARWICK: Stratford-on-Avon, three (L. K. Peach, in B.M. coll.). HANTS: Houndshell, one vii (Adkin coll. in B.M.).
- 1891 DURHAM: Sunderland, ix (*Cat. Lep. North. Durh. and Newcastle*); Hartlepool, one (A. E. Gardner coll.). YORKS: Saltburn, one 15.viii (Maddison, *Ent. Rec.* **2**:185); Hull, one (*Ent. Rec.* **3**:35). CAMBS: Wicken, at sugar 1.viii and three or four nightly for some days (Tutt, *Ent. Rec.* **2**:132). OXON: Chinnor, six at sugar (Spiller, *Ent.* **24**:267 and *Ent. Rec.* **3**:64). KENT: Canterbury, one (J. Parry, B.M. coll.).
- 1892 YORKS: Saltburn, four (Maddison, *Ent. Rec.* **3**:234). CAMBS: Cambridge, three mid ix (Holland, *Ent. Rec.* **2**:265); Wicken, many (Bailey, B.M. coll.). OXON: Chinnor, 50, two at sugar, rest in outhouses (*Ent. Rec.* **3**:205); near Reading, mid ix (*Ent. Rec.* **2**:265). WILTS: 21/24.vii, freely at sugar (Kimber, *Ent. mon. Mag.* **28**:246); Marlborough, three (O.U.M.).
- 1893 YORKS: Hull (several B.M. coll.); CAMBS: Wicken, many vi/vii (*Ent. Rec.* **4**:235, 254, **7**:106, *Ent. mon. Mag.* **29**:212); Cambridge (*Ent. Rec.* 106). BUCKS: Halton and the Chiltern District, abundant (*V.C.H. Bucks*). OXON: Chinnor, 200 from 28.v onwards and less numerous second brood in viii (*Ent. Rec.* **5**:52 and B.M. coll.). WILTS: Marlborough, two (O.U.M.).
- 1894 DURHAM: Hartlepool, one (*Ent. Rec.* **5**:297). YORKS: Hull, 100, ten in one night (*Ent. Rec.* **5**:297 and B. M. coll.). Lincs: Panton, four vii/viii (Tring coll.). CAMBS: Wicken, 'about usual numbers' (*Ent. Rec.* **6**:16), many (B.M. coll.); Cambridge, one (Tring coll.). ESSEX: Rainham, 120 5.vii/6.ix (C. R. N. Burrowes, *Ent. Rec.* **5**:204, 284); Mucking, two (Tring coll.); Noak Hill, Romford, one 4.viii (Meldola, O.U.M.); Epping, two (*Ent. Rec.* **6**:292); Ongar Park Wood, at sugar (*Ent.* **65**:69). KENT: Hythe, four vii (S. Lond. *ent. nat. hist. Soc.* coll.). MIDDLESEX: Ealing (*Moths Lond. Dist.*); Crouch End, 3.viii and Hale End 6.ix. (*Ent.* **28**:87). WILTS: Marlborough, one (O.U.M.). OXON: Chinnor, several (Spiller, B.M. coll.). WORCS: Castle Moreton, two (Fox, B.M. coll.).
- 1895 Lincs: Panton, one vii (Tring coll.); Market Rasen, vii (*Lep. Lincs.* and Tring coll.); Lincoln, several (B.M. coll.). CAMBS: Wicken, viii, 'only a few' (Brady, *Ent. Rec.* **7**:66). NORFOLK: Brandon, few (F. D. Wheeler, B.M. coll.). ESSEX: Mucking, 'though not in such numbers as before' (*Ent. Rec.* **7**:65). ton, 'scarcer than usual' (*Ent. Rec.* **7**:158).

- 1896 DURHAM: Hartlepool, two (Wightman coll.); Lincs: Market Rasen (*Lep. Lincs.*), two (Tring coll.), one (O.U.M.). NORTHANTS: at sugar (*Ent. Rec.* 8:270); ESSEX: Mucking, one viii (Tring coll.). BERKS: Boars Hill, vii/viii, at least eleven (N. V. Sidgwick and others, O.U.M. and Diaries). GLOS: Coxhorne, vii/early viii (*Ent. Rec.* 8:310). HUNTS: Conington, vii, one (A. E. Gardner coll.). WARWICK: Rugby, one 30.vi (N. V. Sidgwick, O.U.M.).
- 1897 Lincs: Market Rasen, two (Tring coll.) (*Lep. Lincs.*). CAMBS: Wicken, 'but few' (Moberly, *Ent. Rec.* 9:296). ESSEX: Rainham, two (Tring coll.). GLOS: near Gloucester (Kimberland), vi, 'not previously reported from this part of Glos' (J. D. Birchall, *Ent.* 31:47); Birdlip, vi (Sidgwick, in *Cat. Lep. Glos.*). WALES: Barmouth, at valerian (Burns, *Ent.* 31:248).
- 1898 ESSEX: Mucking, one viii (Tring coll.). WILTS: Calne, recently (Eddrup, *Ent. Rec.* 11:27).
- 1899 None found.
- 1900 SALOP: Market Drayton, one early viii (F. C. Woodforde, *Ent. Rec.* 12:338, B.M. coll.). SUFFOLK: Bury, two 'about 1900' (*Lep. Suff.*). HERTS: Tring, one 28.vii (Tring coll.).
- 1901 YORKS: Middlesbrough, two (*V.C.H. Yorks.*). HERTS: St. Albans, one (Tring coll.).
- 1902 HERTS: St. Albans, one (Tring coll.). ESSEX: Maldon, four vii (Tring coll.); Mucking, 'more than usually common' (nine). (*Ent. Rec.* 14:285), one ix (Tring coll.).
- 1903 YORKS: Spurn Point, three 1.viii (R. Chapman, O.U.M.).
- 1904 HUNTS: Monks Wood (Tait, *Ent.* 37:292).
- 1905 HUNTS: Fens, 17.vi/4.vii (Cox and Brooke, *Ent.* 39:129), commonly (Fryer, *Ent.* 39:141). CAMBS: Wicken, one 9.vii (W. M. Geldart, O.U.M.). Lincs: Haverholme Priory, very common (*Lep. Lincs.*), three (Tring coll.); Lincolnshire, eight vii (Tring coll.). HERTS: Hitchin (Tutt, *Ent. Rec.* 12:305). NOTTS: South Leverton, at sugar several times by Thornley (*V.C.H. Notts.*).
- 1906 Lincs: Haverholme, one vii (Tring coll.). DERBY: Repton (*Lep. Derb.*).
- 1907 DURHAM: Hartlepool, one vii (J. G. Gardner, Tring coll.). ESSEX: Mucking, twelve late viii/early ix (*Ent.* 40:202 and Tring coll.).
- 1908 DURHAM: Hartlepool, one vii (J. G. Gardner, Tring coll.). Lincs: Haverholme, vii, five (Tring coll.), five (Small coll., Canterbury Museum). CAMBS: Wicken, 'almost an absentee' (James, *Ent. Rec.* 20:296). HUNTS: Wennington, one 12.viii (Tring coll.); Huntingdon, one (Tring coll.). KENT: one vii (Tring coll.).

- 1909 HUNTS & NORTHANTS: Woods near Huntingdon, several 2/5.vii, and a few in fen near Peterborough (James, *Ent. Rec.* **23**:65).
- 1910 HUNTS: Monk's Wood, a few (B.M. coll.). ESSEX: Roxwell, two 16.vii (Meldola, O.U.M.).
- 1911 Lincs: Haverholme, one (Tring coll.). HUNTS: one vii (Tring coll.).
- 1912 WILTS: Marlborough, at dusk (Cockayne, *Ent. Rec.* **24**:297).
- 1913/1919 None found.
- 1920 CAMBS: Wicken Fen, a 'nice series' by R. Tait (*Ent. Rec.* **32**:231).
- 1921 CUMBERLAND: Thursby, one at light 3.viii (H. D. Ford, *Ent.* **57**:36, & E. B. Ford, *in litt.*). OXON: Kingsey, one vii (C. F. Thornehill: O.U.M. coll.). HANTS: Portsdown Hills, one (*Macro-lep. Hants*).
- 1922 CAMBS: Wicken Fen, two at sugar 29.vii (Russell James, *Ent. Rec.* **35**:151). NORTHANTS: two 14.viii (Tring coll.). OXON: Shillingford, common end vi and early vii: not seen in previous years (Morris Boorne: *Ent.* **55**:235). BERKS: Bagley Wood, 12.vii (E. G. R. Waters: O.U.M.); Pidnell, near Faringdon, one at sugar 20.vii (C. Donovan: O.U.M.).
- 1923 BERKS: Bagley Wood, 20.vi (E. G. R. Waters: O.U.M.).
- 1924/1926 None found.
- 1927 OXON: Holton Pits, 14.viii (E. G. R. Waters: O.U.M.).
- 1928/1934 None found.
- 1935 CAMBS: Wicken Fen, four 6.vii and three 5.viii (A. Richardson *in litt.*). SUFFOLK: Sotterley, two at light (*Lep. Suff.*). ESSEX: Epping Forest, vii (Tring coll.).
- 1936 N.W.ESSEX/HERTS: abundant Manuden and Stortford, taken Little Hadham (P. B. M. Allan, *Ent. Rec.* **48**:119 and *Lep. Stort.*); Great Yeldham, reported abundant and a few taken at sugar 28.vii (C. de Worms, *in litt.*). ESSEX: Loughton (*Moths Lond. Dist.*). CAMBS: Wicken, one at sugar 26.vii (E. J. Hare, *in litt.*).
- 1937 None found.
- 1938 HUNTS: Monk's Wood, four at sugar 15.vii/1.viii (E. J. Hare, *in litt.*). HERTS: Stortford, at sugar (*Lep. Stort.*).
- 1939 Lincs: Lincoln, one 30.vii (A. Richardson, *in litt.*). HUNTS: Woodwalton Fen, one at sugar 2.vii (C. de Worms, *Ent.* **73**:65); Monk's Wood, viii (Tring coll.). BERKS: Boars Hill, one at sugar 29.vi (R. F. Bretherton); Cothill, one 2.vii (A. Richardson, *in litt.*). OXON: between 1936 and 1939, Banbury, rare (J. Cheney, *orally*).
- 1940 HERTS: Stortford, at sugar (*Lep. Stort.*).
- 1941 HERTS: one viii (Tring coll.).

- 1942 HUNTS: St. Neots (S. B. Hodgson, *Ent.* **76**:21). EASTERN COUNTIES: '1942 was also a year for *S. raxida* which, as in 1936, appeared abundantly' (C. de Worms, *Ent.* **76**:46). KENT: Pinden, one in a black-out blind 23.viii (E. J. Hare, *in litt.*).
- 1943 GLOS: Bourton-on-the-Water, two on buddleia 17.vii (A. G. Tayler, *in litt.*). Several also taken here between 1930 and 1940 by C. Donovan (*Macro-lep. Glos.*). WILTS: Salisbury, a few, chiefly in houses (C. de Worms, *Ent.* **76**:46).
- 1944 GLOS: Bourton, two at sugar 3.vii & 4.viii (A.G.T.). BEDS: Woburn Sands, many in outhouses about 12.vii (R. C. Edwards, *in litt.*). HANTS: Micheldever, a few in a shed late vii (R. C. Edwards *in litt.*).
- 1945 LANCs: Ditton, near Widnes, one on rotten fruit 1.ix (F. B. M. Carr, *Ent.* **79**:54). GLOS: Bourton, one at rest 26.vi, two on buddleia 14.vii & 23.viii (A.G.T.), one viii (R. E. Vaughn-Roberts, King coll.). BUCKS: Aston Hills, one 28.vii (Tring coll.). KENT: Pinden, one at sugar 5.viii (E.J.H.).
- 1946 CHESHIRE: Pulford, near Wrexham, one at electric light (*Lep. Cheshire, Denbigh, etc.*). KENT: Pinden, one at sugar 30.vii (E.J.H.); Deal Sandhills, one 13.vii (G. Youden, *Ent.* **80**:175). LINC's: one 9.vii (R. E. Vaughn-Roberts, King coll.).
- 1947 WARWICK: Tysoe, one bred vii, one caught viii (Trevor Trought, *in litt.*).
- 1948 KENT: Grove Park, 3.viii (*Moths Lond. Dist.*).
- 1949 HERTS: Rothamsted, one in light trap early vii (R. A. French, *Ent.* **84**:53). KENT: Pinden, three at sugar 4.vii, 23.vii, 8.ix (E.J.H.).
- 1950/1952 None found.
- 1953 MIDDLESEX: Stanmore, one vii (Lorimer).
- 1954 GLOS: Bourton, one at light 26.viii (A.G.T.). MIDDLESEX: Feltham, one in mercury vapour light trap 23.viii (E. W. Classey, *Ent. Gaz.* **6**:165).
- 1955 CAMBS: Balsham, one at light 1.vii (G. A. Ford, *Ent. Rec.* **67**:264).

ABBREVIATIONS USED ABOVE

- Tring coll. The Cockayne/Kettlewell Collection at the Zoological Museum, Tring, Herts.
- O.U.M. The Hope Collection, Oxford University Museum.
- Macro-lep. Hants.* Fassnidge, W. The Macro-lepidoptera of Hampshire, 1923/4.
- Lep. Suff.* Vinter, C. H. S. and Waller, A. P. The lepidoptera of Suffolk, 1937.
- Lep. Stort.* The Macro-lepidoptera of Bishop's Stortford and District, 1949 (Transactions of the Bishop's Stortford and District Natural History Society, volume 1, part 1, 1950)
- Moths Lond. Dist.* de Worms, C. G. The Moths of London and its Surroundings, part 2, 1955 (London Naturalist Reprint No. 89).

Macro-lep. Glos. Donovan, C. A Catalogue of the Macro-lepidoptera of Gloucestershire, 1941, and Supplement by Austin Richardson, 1944 (Proc. Cotteswold Naturalists' Field Club, vols. 27, 28).

Lep. Cheshire, Denbigh, etc. Gordon Smith, S. The Butterflies and Moths found in the Counties of Cheshire, Flintshire, Denbighshire, Caernarvonshire, Anglesey and Merionethshire, 1948.

Ent. The Entomologist.

Ent. Rec. The Entomologist's Record and Journal of Variation.

Ent. Gaz. The Entomologist's Gazette.

Ent. mon. Mag. The Entomologists' Monthly Magazine.

OTHER EVIDENCE WHICH CANNOT BE EXACTLY DATED

SCOTLAND: Scotland (*Stephens*, 1829); Edinburgh (*Stainton*, 1857); Forth, Solway, Clyde: not common, agrestal (*Buchanan White*, 1872); Ayrshire (*Barrett*, 1896).

NORTHUMBERLAND: Kenton (*Robson*, 1899).

DURHAM: South Shields, several at sugar and also behind window shutters; Seaton, by Sang; Greatham, by Lofthouse; Hartlepool, a specimen or two at sugar nearly every autumn, but not numerous (*Robson*, 1899).

YORKSHIRE: York, common; Scarborough, abundant (*Stainton*, 1857) Nunborneholme; Nafferton (*Morris*, 1872); Askham Bog; Balby, near Doncaster, one; Wakefield; Spurn, abundant; rare except on the coast (*Porrirt*, 1883).

LANCASHIRE: Rusholme, near Manchester (*V.C.H.*, 1906).

LINCOLNSHIRE: Osgodby (*Morris*, 1872); Brocklesby District; Grimsby District; Panton, not rare; Skegness; Wickenby; Wragby; Allington; Cowbit. Frequent in some parts of the County. (*Mason*, 1908.)

NOTTS: Sherwood Forest, rarely (*V.C.H.*, 1906).

DERBYSHIRE: Barrow, scarce (*V.C.H.*, 1905).

STAFFORDSHIRE: Burton-on-Trent (*Stainton*, 1857), rare; Burnt Woods, one (*V.C.H.*, 1908).

SALOP: Netley (*Stephens*, 1829); occurs sparingly in many parts (*V.C.H.*, 1902).

HEREFORD: Ross, by Purchas (*V.C.H.*, 1908).

WORCESTER: Worcester (*Stainton*, 1857); Castle Moreton, occurred freely in the Vicarage for ten years and also at sugar; Grimley; apparently very erratic (*V.C.H.*, 1901).

WARWICKSHIRE: Very rare. Whitchurch (*V.C.H.*, 1904).

LEICESTERSHIRE: Quorn; Wigston; Kibworth; Gumley. At sugar (*V.C.H.*, 1907).

NORTHANTS: Peterborough, one in Dale coll., O.U.M. (before 1906), in ten years before 1932 (*Pooles*, 1932).

CAMBS: Cambridge, common (*Stainton*, 1857). Well distributed, fairly common in some years (*V.C.H.*, 1938). Chatteris District, quite common 1876 to 1903, but then became very scarce (*Fryer, Ent.* 47:299, 1914); Bottisham, by Rev. L. Jenyns (*Stephens*, 1829).

NORFOLK: August, by Rev. J. Burrell, in gardens (*Haworth*, 1903); Lynn, Hunstanton, Thetford, scarce (*V.C.H.*, 1901).

SUFFOLK: Stowmarket (*Stainton*, 1857).

HERTS: Hitchin (*Durrant*, 1884); Haileybury (*Bowyer*, 1887; East Barnet, by Gillin; Cheshunt, by Boyd (*V.C.H.*, 1908); Watford; Hoddesdon (*Foster*, 1937).

ESSEX: Colchester, Brentwood, Stanford-le-Hope, Southend (*V.C.H.*, 1902).

KENT: Kent (*Newman*, 1870); Greenhithe; Folkestone (*V.C.H.*, 1908); Isle of Sheppey (J. J. Walker, one in O.U.M.); Chatten-den, one in Dale coll., O.U.M. (before 1906).

SURREY: Lewisham (*Morris*, 1872); Reigate (*V.C.H.*, 1902).

BEDFORDSHIRE: Bedford, very local (*V.C.H.*, 1904).

BUCKS: Halton (*Stainton*, 1857).

OXON: Pyrton, four in O.U.M. (J. W. B. Bell, 1890/1915); Caversham; Mapledurham (*V.C.H.*, 1936).

BERKS: Burghfield; Englefield, by Young, rare (*V.C.H.*, 1906); Streatley, one in O.U.M. (J. J. Walker); Radley, rare (*Carter in T. Field, The Radley District*, 1912); Abingdon, not uncommon (C. Rippon, *in litt.*, 1939).

GLOS: Stapleton, near Bristol, one (*Hudd*, 1877).

HANTS: Bassett, near Southampton, one (*Fassnidge*, 1923).

DORSET: 'by Mr. Dale' (*Newman*, 1870: but Dale himself makes no mention of it); Cranborne, one, no date (*Parkinson Curtiss*, 1934).

DEVON: Alphington and Torquay (*Newman*, 1870).

SOMERSET: Baltonsborough, near Glastonbury, by St. John (*V.C.H.*, 1906).

No evidence, dated or undated, has been found for WESTMORLAND, SUSSEX, CORNWALL or the ISLE OF MAN: the only record from IRELAND is very old and doubtful.

A NOTE ON *PARAMESIA GNOMANA* CLERCK
(LEP: TORTRICIDAE)

In their note on *Paramesia gnomana* Cl., (1956, *Ent. Gaz.*, 7: 152-153) Messrs. Bradley and Martin have overlooked the female specimen I found in the late J. Cosmo Melvill's series of *costana* F. Like almost all Melvill's micros the insect had no data label, but it was set in the English style, and as it was mixed with a lot of very ordinary English *costana* there seem some grounds for presuming it to be of British origin. A fuller account will be found in the *Entomologist* for December, 1951.

65 Eastwood Boulevard,
Westcliff-on-Sea,
Essex.

H. C. HUGGINS.

BOOK REVIEWS

Handbooks for the Identification of British Insects, Vol. I Part 5. Dermaptera and Orthoptera, by W. D. Hincks. Revised and Reprinted, 1956 (Royal Entomological Society of London). Pp. 24, 74 line illustrations. Price 6s. 0d.

Since it was first published in 1949, this work has proved of the utmost value to all students interested in the rather neglected orders Dermaptera and Orthoptera. In this latest edition the author has taken the opportunity to bring the nomenclature up to date and to add additional facts and figures to aid identification.

A number of new casual introductions are listed, but it is to be regretted that not all these species are described in sufficient detail for identifications to be made. This latest, and deservedly popular, volume will, we are sure, find a ready sale, but the price having risen from three shillings and sixpence to six shillings seems high in proportion to the recent reprinted volume on Odonata.

A.E.G.

Taxonomist's Glossary of Genitalia in Insects. 1956. Edited by S. L. Tuxen. Pp. 284, 215 line illustrations. Copenhagen. Price £4 10s.

Thirty-four specialists have contributed their knowledge to make this a work of outstanding importance to all entomologists. To taxonomists and morphologists (especially lepidopterists) it will, no doubt, be regarded as 'the answer to a maiden's prayer'.

The Editor makes it clear in his Preface that no attempt has been made to enforce a uniform terminology, although many of us may think this desirable. No doubt this ideal cannot be obtained until the true morphology and homology of some of the more obscure structures have been more fully studied.

Part one is devoted to the male and female genitalia of representative species of the twenty-nine Orders. The structure is described, terms used by earlier authors elucidated and important references quoted. The illustrations are of high quality and are of sufficient size to enable the most complex form to be appreciated.

Part two is devoted to the Glossary; this occupies over one hundred pages and lists over four thousand terms. Each term (printed in bold type) is defined, has relative synonyms listed and references quoted. Absolute synonyms or homologies are indicated, also those possible but not proved. The Glossary is of paramount value and will become a standard reference; it will contribute much in assisting to unravel the confusion which exists relating to the terminology of the copulatory structure.

The work is well printed, pleasant to handle and a monument to the keenness of the contributors who helped to produce this work first proposed by the Editor in 1951 at the Amsterdam Congress.

A.E.G.

OBSERVATIONS ON THE BRITISH AGROMYZIDAE (DIPT.)—III

THREE NEW SPECIES OF THE GENUS *PHYTOMYZA* FALLEN AND FURTHER ADDITIONS TO THE BRITISH LIST

By KENNETH A. SPENCER, B.A., F.R.E.S.

In June and also in August, 1954, I swept series of a *Phytomyza* sp. on Hampstead Heath, London, which did not run to any known species in Hendel's key (1936). Prof. E. M. Hering has kindly examined some of the specimens in Berlin and has confirmed that the species is new to science.

Phytomyza intermedia sp. n.

Head

(Fig. 1.) Frons at foremost ocellus twice width of an eye; orbits well defined, raised above frons but not visible in profile. Lunula small but forming an arc higher than a semi-circle. Cheek quarter height of eye, jowls conspicuous below eye but not visible in profile. Eyes with a few sparse hairs centrally. Two ors directed upwards and slightly outwards, posterior ors normally only slightly smaller than anterior one. Distance between ors half that from posterior ors to vti. Two ori directed inwards, the anterior one very much smaller. Posterior ori noticeably closer to eye margin than anterior ors. Orbital hairs sparse and slight, extending posteriorly only to anterior ors. Antennae small, normal.

Mesonotum

2nd, 3rd and 4th dc equidistant, distance between 1st and 2nd greater; 4th dc anterior to prsut. Acr short and fine, in 2-3 irregular rows extending normally slightly beyond 2nd dc. 0-4 post-sutural hairs.

Wing

Average ratio of 2nd to 4th costal segments in 4 males 3.3:1 and in 16 females 3.4:1. Average wing length: ♂ 2.16 mm, ♀ 2.56 mm.

Colour

Frons dark-brown but distinctly lighter than the greyish black orbits and ocellar triangle. Mesonotum matt, blackish grey but still somewhat shining. Pleura uniformly similar, apart from the narrow greyish-yellow upper and hind margins of the mesopleura. Squamal fringe black. Abdomen black, more shining, lateral connective tissue conspicuously greyish-yellow. Legs greyish-black except for narrow yellowish knees on fore-legs.

Holotype: ♀ 24th June, 1954, Hampstead. Paratypes: all Hampstead, three ♂ 6th June, 1954, one 24th June; ♀ three 9th June,

nine 24th June, two 14th August. One ♀ paratype presented to Prof. Hering, Berlin, and one ♂ and one ♀ paratype presented to the British Museum (Natural History), remainder in my collection.

This species runs to four possible couplets in Hendel's key, as the 2 ors may be either equal in length or the posterior one shorter (couplet 152) and the costal ratio may fit either alternative of couplets 153 and 194. The relevant couplets should be amended as follows to include the new species:

- 156 2. Flügelrandabschnitt weniger als 4mal so lang wie der 4 *intermedia* sp. nov.
 - Mehr als 4 mal so lang 156a
 156a wie 156 in Hendel
 162 2. Flügelrandabschnitt über 3mal so lang wie der 4
 *intermedia* sp. nov.
 - $1\frac{1}{2}$ bis $2\frac{3}{4}$ mal so lang 162a
 162a wie 162 in Hendel
 205c 4. dc in der Querlinie der prsut, 2. etwa in der Mitte zwischen
 1. und 3. dc. Arista kurz, 3mal so lang wie der Durchmesser des
 3. Fühlergliedes. i. pa. kurz, haarförmig ... *coniophila* Hering
 - 4. dc vor der Querlinie der prsut. Die 2. dc näher der 3.
 als der 1. 205d
 205d 1. ors höchstens $\frac{1}{2}$ der 2. ors lang *seseleos* Hering
 1. ors wenigstens $\frac{3}{4}$ der 2. lang, meist fast gleich lang und
 gleich stark mit ihr, wenig schwächer *intermedia* sp. n.
 227 Orbiten glänzend, Orbiten-Härchen dicht mehrreihig. Mesono-
 tum mit etwas Fettglanz *sedicola* Hering
 - Orbiten matt. Orbitenhärchen 1 reihig, höchstens mit einigen
 überzähligen Härchen neben der Reihe 227a
 227a Stirn oben breiter als der halbe Kopf. Lunula auffallend gross.
 Mesonotum dicht aschgrau bestäubt, ohne Spur von Glanz ...
 227b
 - Stirn oben höchstens von halber Kopfbreite, Lunula weniger
 auffallend 227c
 227b Lunula silberweiss, gegen die dunkle Stirnstrieme stark
 kontrastierend *calthae* Hering
 - Lunula dunkel, wenig von der Stirnstrieme abgehoben
 *poppii* Rydén
 227c Mesonotum matt aschgrau bestäubt, ohne Spur von Glanz. Stirn
 nach vorn wenig verschmälert, Lunula halbkreisförmig
 *melana* Hd.
 - Mesonotum schwarzgrau bestäubt, *in schrägem Licht mit
 Spuren von Fettglanz. Lunula parabolisch, stärker als
 halbkreisförmig gekrümmt *intermedia* sp. n.

I have recently examined a long series of specimens from various localities in Somerset which are referable to this species, which thus

appears to be widely distributed, at least in southern England. There is as yet no evidence as to its food-plant.

II. A number of puparia were obtained from leaf mines on *Heracleum sphondylium* L. on Hampstead Heath at the end of May, 1953, which differed substantially from the mines of *Phytomyza spondylii* R.-D. and *P. heracleana* Hg., the two Agromyzids which occur commonly on this plant. No flies, however, emerged. On the 5th June, 1954, further puparia were obtained from similar mines at Corsham, Wilts. These produced flies in April, 1955, and the species has proved new to science.

Phytomyza sphondyliivora sp. n.

Head

(Fig. 2.) Frons at foremost ocellus twice width of eye, in profile broadly visible above eye. Orbits broad, pronounced. 2 ors, posterior not much more than half length of anterior, 2 ori. Orbital setae extending irregularly between upper ors and lower ori. Jowls broad, together with cheeks half height of eye. Antennae set well apart, 3rd segment round.

Thorax

Four strong dc, 3rd at, 4th anterior to prs. acr sparse, in 2-4 rows, irregular, extending slightly beyond 2nd dc. 4-6 post-sutural ia hairs.

Wing

Length, 2.6 mm. 2nd costal segment approximately $3\frac{1}{2}$ times length of 4th.

Colour

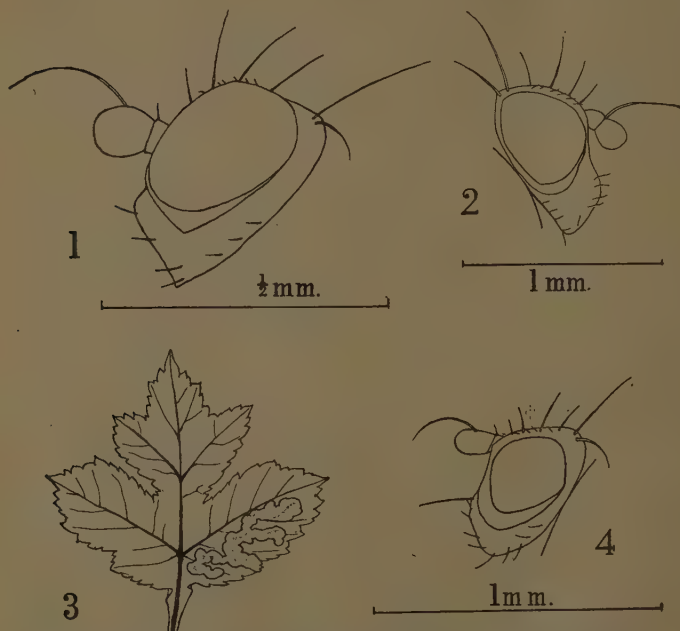
Frons, cheeks and jowls deep orange-yellow. Hind margin of eye black, vti on black ground. Entire orbits from vti to front ori blackish-grey. Face entirely black, including median keel. 2nd and 3rd antennal segments black, 1st yellowish. Mesonotum and pleura matt grey. Mesopleura with distinct yellow hind and upper margin, notopleura and humeral callus entirely black. Squamal fringe black, long. Legs black, but knees on P1 bright yellow, on P2 and P3 only indistinctly brownish-red.

The species runs to couplet 111b in Hendel's key (1936, p. 506), as amended by Hering, and this couplet should be further extended as follows to include the new species:

111b	Suturaldreieck schwarz	111bb
-	Suturaldreieck gelblich bis lederbraun	111c
111bb	Augenrand gelb	<i>latifolii</i> Groschke (in litt.)
-	Augenrand deutlich geschwärzt	<i>sphondyliivora</i> sp. n.

Holotype: ♀, bred from leaf mines on *Heracleum sphondylium* L. at Corsham, Wilts, 9th April, 1955; paratypes: 5 ♂, 7 ♀, all topotypical in my collection; 1 ♂, 1 ♀ paratype presented to the British Museum (Natural History), 1 ♀ presented to Prof. E. M. Hering, Berlin.

The broad, blackish-grey orbits are a characteristic feature of this species and it can be readily distinguished from *Phytomyza spondylii* R.-D. which invariably occurs together with it by its shorter 2nd costal segment.



Figs. 1-4. (1) Head of *Phytomyza intermedia* sp. n. (2) Head of *P. sphondyliivora* sp. n. (3) Leaf mine of *P. sphondyliivora*. (4) Head of *P. vulnerariae* sp. n.

The leaf mine (Fig. 3) is entirely distinct from that of *Phytomyza spondylii* R.-D. It is an irregular, broadish linear mine, which is inter-parenchymal throughout its length and therefore frequently not easily visible. It appears somewhat lighter green than the remainder of the leaf and later may turn yellowish. The mines occur at the beginning of June and there is only a single generation, while in *P. spondylii* R.-D. there are two or even three.

III. At Hope, South Devon, on the 16th September, 1954, I collected some leaves of *Anthyllis vulneraria* L. containing mines of *Scaptomyza* sp, and also some flower-heads. On checking the tin containing these specimens some weeks later I was surprised to find

2 dead Agromyzids and also the 2 yellowish-brown puparia from which they had emerged. Careful examination revealed small linear mines in the involucre bracts of the flower-heads. Prof. E. M. Hering has kindly examined the specimens and confirmed that the species is new to science.

Phytomyza vulnerariae sp. n.

A small, all-black species.

Head

(Fig. 4.) Frons at vertical triangle just less than twice width of eye. In profile orbits projecting substantially above eye; 2 ors directed upwards, posterior slightly shorter than anterior, 2 ori directed inwards. Orbital setae in single row, rather long. Orbits broad, narrowing at base of antennae. Cheeks and jowls broad, slightly more than half vertical diameter of eye. Third antennal segment relatively large, longer than broad, oblong.

Thorax

3 + 1 dc; 3rd at, 4th well before suture. Acr sparse but long, in 2 rows, extending to midway between 1st and 2nd dc. Two longish hairs in ia area, inner pa half length of outer.

Wing

Length 2.16 mm. 2nd costal segment short, $1\frac{1}{3}$ - $1\frac{1}{2}$ times length of 4th.

Colour

Head, mesonotum black, somewhat shiny, mesopleura deeper, glossy black, legs uniformly black, even at knees. Squamae dark grey, fringe black. Abdomen more shiny but with greyish pubescence. In ♀ 6th tergite with light, whitish-grey margin.

Identification of the species in Hendel's key (1936, p. 513) leads to couplet 218, which should be extended as follows:

- 218 Mesonotum vorherrschend glänzend, 2. Flügelrandabschnitt etwa $1\frac{1}{2}$ x so lang wie der 4 218a
 - Mesonotum vorherrschend matt. 2. Randabschnitt 2 mal so lang wie der 4 219
 218a Das 3. Fühlerglied nach vorn stark erweitert, unten stark konvex, oben vorn mit gerundeter Ecke *brischkei* Hend.
 - 3. Fühlerglied mit graden parallelen Rändern oben und unten, oben vorn ohne gerundete Ecke *vulnerariae* sp. n.

The species can readily be distinguished from *melana* Hd. by its all-black legs, and from *petöi* Hg. by its shorter 2nd costal segment.

Holotype ♀, paratype ♂, Hope, S. Devon, bred from *Anthyllis vulneraria* L., end September, 1954, both in my collection.

IV. BELOW ARE LISTED 6 FURTHER ADDITIONS TO THE BRITISH LIST

Melanagromyza albocilia Hd. New to Britain.

Among material sent to me by Mr. E. A. Fonseca for determination I discovered a single specimen swept at Butley Thicks, Suffolk, on 1st June, 1952. The species is distinguishable from *lappae* Loew by

its upright or reclinate orbital setae and from *cunctans* Mg. by its projecting frons. Biology unknown. Not common.

M. beckeri Hd. New to Britain. I had previously published a record of this species (Spencer, 1953), which I found it necessary later to delete (Spencer, 1956). However, among Fonseca's material I found 1 specimen taken at Berrow, Som., on the 16th May, 1954, which is beyond doubt referable to this species. The orbital setae are all reclinate apart from 4 or 5 at the upper ors; this permits immediate separation from *cunctata* Hd., where these setae are long and proclinate apart from a few at lower ori.

Ophiomyia senecionina Hg. New to Britain. I recently discovered 3 specimens of this species among material kindly presented to me by Mr. Niblett which he had bred from various stems during the past few years. The specimens were bred from stems of *Senecio* spp. from Ashted, Banstead and Bookham, Surrey, and the emergence dates are the 10th and 27th May and the 4th July. The species forms a linear mine along the outer layers of the stem, pupating in the mine. It has previously only been recorded from the North of France (Hering, 1944).

Liriomyza pumila Mg. New to Britain. Leaf mines with larvae were found at Scratch Wood, Mddx., on the 24th August, 1955, on the food-plant *Achillea ptarmica* L. The mines of this species superficially resemble those of the commoner species occurring on this plant, *Phytomyza corvumontana* Hd.; however in the latter the frass is in separate grains, in the former it is in more or less connected strips. On the Continent the species is locally abundant where the food-plant occurs.

Phytomyza brevicornis Hd. New to Britain. I swept one specimen at Chippenham Fen, Cambs., on 5th June, 1955, and Griffiths obtained one on the same occasion. The only other specimen known is the type taken by Hendel in Dalmatia. Biology unknown. This species very closely resembles *P. murina* Hd. but the face is dark-brown to black, while in *murina* Hd. it is yellow. It seems possible that these are forms of a single species, but more material is required before this can be decided.

P. succisae Hd. New to Britain. I found mines of this species to be common at Scratch Wood on *Succisa pratensis* L. at the end of August, 1955. A fly emerged at the end of September. The mine gives rise to a characteristic purple discoloration of the leaf distally of the point being mined, and mined leaves can in this way be very easily detected. Pupation takes place in the leaf and the fly is easily distinguishable by its complete absence of acrostichals. On the Continent widely distributed with its food-plant.

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19 Redington Road,
London, N.W.3
10th July, 1956.
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ACHERONTIA ATROPOS (L.) IN ESSEX
(LEP: SPHINGIDAE)

A large female *Acherontia atropos* was taken in my garden at mercury vapour light on the night of 15th June, 1956.
The Little House, DAVID MORE.
Hockley Road,
Rayleigh, Essex.

A NOTE ON THE OVA AND LARVA OF *HETEROGRAPHIS*
OBLITELLA (ZELLER)
(LEP: PHYCITIDAE)

A female of this species captured on the 11th May, 1956, deposited ova during the night on the sides of the pill-box in which it was placed. The ova, nearly spherical, measured .5 x .4 mm.; the surface smooth. They were opalescent and the colour very pale cream, bordering on white, which changed to pale orange on the 15th May. Larvae appeared on the 24th May.

Mr. S. Wakely informed me that the newly hatched larvae which he had obtained showed no interest in dry vegetable matter, but nibbled the lower leaves of Shepherd's Purse *Capsella bursa-pastoris* (L.). Having to be away from home I put my larvae in a large cylindrical breeding cage, planted with several low-growing plants including Shepherd's Purse and *Chenopodium*. On my return I searched the breeding cage but could not see any larvæ, although the leaves of *Chenopodium* had been eaten. Possibly the larvae burrow into the soil during daytime.

A full-fed larva crawled up the side of the breeding cage on the 29th July. It was 14 mm. in length, rather stout, not tapering at either end; head black with a few short hairs, plate of 2 dark brown, broken at the centre and on the sides with the ground colour of the larva, which was dull cream with a slight greenish tinge. Dorsal line pale brown, two subdorsal and two lateral lines narrower and paler, all the lines broken at the segments, particularly so the first subdorsal line. Setae short, grey-black, arising from minute black dots.

The larva spun a fairly thick cocoon at the top of the breeding cage, pupated about ten days later, and the moth, a male, emerged on the 30th August, 1956.

28 Park Hill Road,
Bexley, Kent.

L. T. FORD.

BOOK REVIEW

South African Animal Life. Results of the Lund University Expedition in 1950-1951. Edited by Bertil Hanström, Per Brinck and Gustaf Rudebeck. Vols. I and II. Size $8\frac{1}{2}$ by $5\frac{1}{2}$ in. Vol. I, 1-518 pp., 12 pls., 135 figs., 5 maps. Vol. II, 1-576 pp., 7 pls., 661 figs. Stockholm, 1955. Price in U.K. £6 per volume.

Volume I contains an interesting introduction, a first chapter giving an historical account of Swedish zoological work in S. Africa since the eighteenth century. The list of localities; Turbellaria; Solifugae, Scorpions and Pedipalpi; Pseudoscorpionidea; and Gyrinidae, are dealt with in succeeding chapters.

Volume II deals with Symphyla; Chilopoda; Protura; two families of Diplura in chaps. IV and V; Thysanura; Odonata; Mantidea; Orthoptera; Ensifera and Tridactyloidea; Embioptera; Coleoptera: Notiophygidae; Diptera: Simuliidae, Phlebotominae, Chironomidae and Bombyliidae; Mallophaga. The last chapter deals with a collection of birds collected at the end of the eighteenth century by Eriksson. The sections on Symphyla, Protura, Tridactyloidea and Embioptera are very short.

Each volume, as may be seen from the above chapter headings, contains a series of papers written by various specialists which are mainly in English (occasionally in French or German), dealing with the taxonomy and distribution of their groups. The editors' intention is to present the full results in about eight volumes.

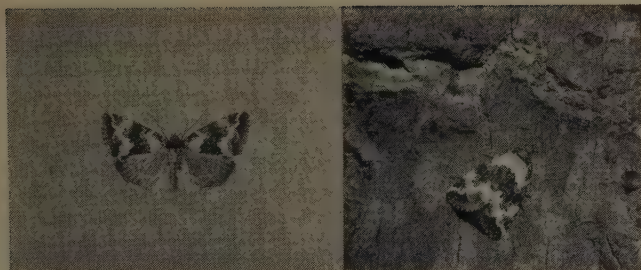
This remarkable work will be welcomed by all entomologists who have an interest in the African fauna, and by none more than workers in Africa itself. The need for a comprehensive and recent account of the fauna of S. Africa has long been felt. Naturally in the more important papers not only are the results of the expedition given but many other data, often hitherto unpublished, are included, so that each chapter gives an up-to-date review of each group of animals and a list of references. Many new species are described and illustrated, and keys to most of the larger groups are given.

It is perhaps a pity that these volumes are only likely to deal with invertebrates and birds, and the title is rather misleading if this is the case.

These volumes are pleasingly produced, printed on good paper and strongly bound. Opened at any page the book remains flat. There appear to be few errors in the text, and those there are are of a minor nature only (e.g. in Vol. II, Chap. IV, page 83, should be written Chap. VI). The figures are mostly line drawings and quite adequate. The relatively few photographs are uninspiring, however.

The general high standard of this monumental work is well in keeping with the Swedish tradition of zoological research in Africa, and the decision to publish these papers as soon as prepared is an admirable one which might be followed with benefit in this country.

R. C. H. SWEENEY.



Figs. 1-2. *Lithacodia deceptoria* Scop. (natural size).

LITHACODIA DECEPTORIA SCOP., AND *NYCTEROSEA*
OBSTIPATA (F.) IN EAST SUSSEX

Working a mercury vapour bulb over a sheet in my garden at Playden near Rye, I took a specimen of *L. deceptoria* on 28th May, and a male and female of *N. obstipata* on 30th May and 1st June, 1956, respectively. I photographed the former specimen at rest on a piece of bark the next morning and later, after it was set.

It will be deposited in the National Collection at Tring.

M. W. F. TWEEDIE.

August, 1956.

A METHOD OF KILLING 'GREENS'

Green pigment in moths is notoriously fugitive and liable to alteration by such killing agents as ammonia and cyanide. Tetrachlorethane is said to be safe, but I find small, delicate moths very difficult to set if killed with this substance.

On 24th May, 1956, I took several specimens of the Green Carpet (*Colostygia pectinataria* Knoch.) in very fresh and beautiful condition. I killed one with ammonia and put the other four in pill-boxes in the coldest compartment of my domestic refrigerator for 48 hours. At the end of this period they were quite dead and even more perfectly relaxed than ammonia-killed moths, and the colour was, of course, wholly unaffected. The contrast with the one killed with ammonia is quite striking.

I was inspired to this experiment by my friend Hugh Robinson, who deals with moths in this way in Singapore. There they die quickly as the normal environment is constantly at 75-80 deg. F., or higher.

Insurance against revival after setting could be effected by putting the setting-board immediately in an atmosphere of tetrachlorethane—if, indeed, this substance is without effect on green pigments.

M. W. F. TWEEDIE.

August, 1956.

NOTES ON *PROCLOËON PSEUDORUFULUM*
SP.N (= *PROCLOËON RUFULUM* (EATON))
AND ON *CLOËON SIMILE* EATON
(EPHEMEROPTERA)

By D. E. KIMMINS

At the time that I was preparing my keys to the British species of Ephemeroptera, war-time dispersal of the British Museum (Nat. Hist.) libraries prevented me from making as full a study of the literature on *Procloëon rufulum* as I could have wished. Consequently it was considered expedient to follow Eaton's conception of the species *Cloëon rufulum* (Müller, 1776), although it was found necessary to transfer it to the genus *Procloëon* Bengtsson. Subsequent investigation, whilst confirming my views on the generic position of *rufulum* Eaton, have caused me to modify my opinion on the interpretation of Müller's species and a further change in nomenclature appears inevitable.

Müller's collection appears to be lost; according to Hagen (1844, *Stett. ent. Zeit.* 5:141) it was probably destroyed by fire or bombardment in Copenhagen. Müller describes the species as follows (1776, *Zool. Dan. Prodr.*, p. 142): 'Eph. *rufula* diptera, fusca, cauda biseta: setis annulatis; abdominis medio albo; marginibus rufus. *Diaphanum* refert, at alae minores nullae, nec squamulae.'

Bengtsson (1913, *Ark. f. Zool.* 7(36):13) reviewed the status of *rufula* Müller, and on the basis of the above diagnosis, especially the character 'setis annulatis', came to the conclusion that Müller's *rufula* was not the same as Eaton's, and that the only Danish species to which Müller's diagnosis could refer was *Cloëon dipterum* (L.), ♂. He further points out that the *Cloëon rufulum* of Esben-Petersen represents yet a third species, which he had described under the name *bifidum* (later to become the type of the genus *Procloëon*). There is one point, however, in Müller's description to which Bengtsson does not specifically refer, that of the abdomen (abdominis medio albo). This is scarcely typical of *Cloëon dipterum* ♂, although Eaton has described a variety with the segments two to seven translucent white. Bengtsson subsequently described yet another species of this genus (*Cloëon inscriptum*), with the segments two to seven pellucid white, and it is possible that Müller's species would fit here better than in *C. dipterum*, in which case *rufulum* (Müller) would have precedence over *inscriptum*. This a matter for Scandinavian entomologists to settle.

Eaton (1871, *Trans. ent. Soc. Lond.*, 1871:105-6) states that the normal form of *Cloëon rufulum* (his variation 2) has white setae, thus contradicting Müller's diagnosis. He further complicated the issue by describing a variation 1, which had different coloured eyes

in the ♂ and white setae 'with dull reddish joinings'. Since it had the abdomen dark fuscous with pale yellowish joinings, it cannot be the true *rufula* of Müller.

Müller is not likely to have particularized the annulate cerci unless they were a very noticeable feature, and thus one should accept Bengtsson's view that *rufula* Müller and *rufulum* Eaton are not the same. We are thus confronted with the question of the name to be applied to Eaton's *rufulum*. Although Bengtsson was certain that Eaton's *rufulum* was not the same as his *Procloëon bifidum*, he did not specify in what respects they differed, other than the relative separation of the bases of the forceps. On comparing the two descriptions one finds that in *bifidum* the bases of the forceps are described as close together, whereas Eaton says of these structures in *rufulum* that they 'are wider apart at the base than in our other native species' (of *Cloëon*). It is possible that this difference may be due to methods of preservation. I have seen examples (Fig. B) collected by Eaton and preserved in a glycerine mixture in which the forceps are widely separated at their bases. Others, preserved dry or in dilute formalin solution, have the forceps converging or crossing and the bases leaning inwards, the membrane between them crumpled, thus giving the appearance of being closer together. On the other hand, we may have Bengtsson's *bifidum* in this country in addition to *rufulum* Eaton. In other characters the males of the two species are rather alike (I am comparing *bifidum* with variation 2, which Eaton considered the normal form of *rufulum*). Bengtsson made no suggestion that *rufulum* of Eaton was other than a *Cloëon* and in this view he was followed by Lestage, Ulmer and Schoenemund. As I pointed out in my keys (1942), the relative proportions of the first and second tarsal segments of the hind leg of *rufulum* imago determined by Eaton are as three to one, a character of the genus *Procloëon*. Both species are therefore congeneric, and although Bengtsson was certain that they were distinct, there is the possibility that he may have been misled by the contraction of the forceps-base, and that his *bifidum* and Eaton's *rufulum* are one and the the same. In the absence of authentic examples of *bifidum*, I am not prepared to state definitely that Eaton's *rufulum* is a synonym of *bifidum*, and I think it better, until more information is available, to describe *rufulum* Eaton as a new species. The nymphs of both species have two-segmented maxillary palpi and simple gills. The third gill of *rufulum* Eaton as figured by Macan from British material is slightly less pointed than the third gill of *bifidum* figured by Bengtsson.

Eaton (1871) placed *Cloëon dimidiatum* Curtis, 1834, in the synonymy of *rufulum* and this name has been used by Lestage for *rufulum* Eaton. Curtis' description is very brief and most of it would apply to *rufulum* Eaton, but of the cerci he says 'white, remotely dotted with black'. This black marking suggests *dipterum* (L.) rather than *rufulum* Eaton, and I propose therefore to transfer *dimidiatum*

Curtis to the synonymy of *C. dipterum* (L.). There appears to be no other available name for *Cloëon rufulum* Eaton, and in order to link it with the name under which it has long been known, I propose to describe it as *Procloëon pseudorufulum* sp. n.

Procloëon pseudorufulum sp. n.

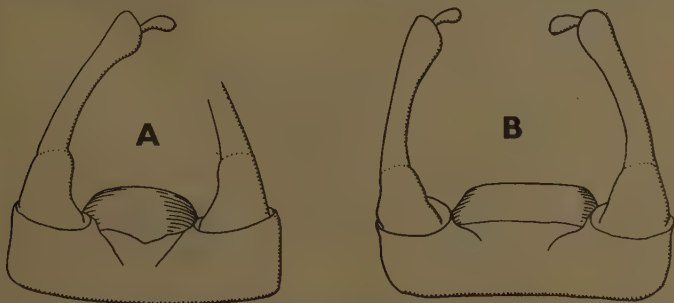
Cloëon russulum Eaton, 1871, Trans. ent. Soc. Lond. **1871**:105, pl. v, Fig. 12 (misspelling of *rufula* Müller); Hagen and Eaton, 1873, op. cit. **1873**:400.

Cloëon rufulum Eaton, 1885 (variation 2), Trans. Linn. Soc. (2), Zool. **3**:188, pl. xvii, 31c, *nec* xlvii, 1.

Procloëon rufulum Kimmins, 1942, Freshw. Biol. Ass., Sci. Publ. **7**:40, Figs. 20R, 21R, 34R; Macan, 1949, Ent. mon. Mag. **85**:224, Figs. 1, 2, 4 (nymph); Harris, 1952, Angler's Entomology (Collins, London), pp. 224-6, pls. 17c, d; Kimmins, 1954, Freshw. Biol. Ass., Sci. Publ. **17**:48, Fig. 20.

♂ (dried). Turbinate eyes dark orange (lemon-yellow in life), antennae fulvous. Thorax light brown, legs ochraceous. Wings hyaline, venation whitish. Abdomen with segments 2-6 translucent, pale ochraceous, apical margins faintly reddish, tracheal trunk blackish. Tergites 7-10 light chestnut, sternites 7-9 and the forceps-base creamy white. Forceps whitish, setae white, sometimes very faintly annulated with reddish.

♂ genitalia (from a fluid example). Forceps-base broad, the margin between the widely separated forceps somewhat membranous, and above it is a transverse, rather more sclerotized plate. Forceps with the two basal segments more or less fused, apex of the second somewhat clavate; terminal segment small, narrowly pear-shaped. As already pointed out, shrinkage of the centre of the forceps-base in preservation may cause the sockets of the forceps to approach one



Procloëon pseudorufulum sp. n. ♂ genitalia from beneath. Fig. A, paratype, Hereford, Kingston; Fig. B, paratype, Berks., Reading, Eaton.

another more closely, as in the figure in my 1942 key, which was drawn from a microscope preparation. Even the sclerotized plate appears to become convex and less transverse (Fig. A).

♀ (dried). Thorax light brown, legs ochraceous. Wings hyaline, venation whitish. Abdomen with tergites light yellowish brown, tinged with light red, tracheal trunk black. Sternites 1-6 translucent ochraceous, 7-9 opaque ochraceous. Cerci whitish, with faint reddish annulations.

Wings of subimago light greyish or greyish white.

Length of fore wing, ♂, 7 mm.; ♀, 8 mm.

I have selected as type and allotype a ♂ and ♀ (in 2% formaldehyde solution) from HEREFORD (Kington, R. Arrow, 17-20. vi. 1947, D. E. Kimmins); also in the British Museum (Nat. Hist.) are paratypes from the following localities:—DEVON (Newton Abbot, canal and R. Teign, Sheepwash, R. Torridge); DORSET; HANTS (Ringwood and Fordingbridge, R. Avon); SURREY (Weybridge, R. Thames); HERTS (Waltham Cross); MIDDLESEX (Laleham); BERKS (Reading); HEREFORD (Kington, R. Arrow); DENBIGH (Llangollen, canal); YORKS (R. Wharfe) and LANCS (Hawkshead). The flight time ranges from late May to September.

This species differs from *Procloëon bifidum* (Bengtsson) in having the bases of the forceps wide apart and the third gill of the nymph slightly less pointed.

Cloëon simile Eaton

This species has also been the subject of some confusion both in this country and in Europe. The adult was described by Eaton in 1870 (*Trans. ent. Soc. Lond.*, p. 2) from British examples. He stated that it was abundant at Clumber Park, near Retford, Notts., and that it also occurred at Quy Fen, near Cambridge. He gave as dates and habitat, September and October, still water. In 1885 (*Trans. Linn. Soc. (2) Zool.* **3**:186, pls. xvii, 31b, xlvii, 2) Eaton redescribed the adult, gave the continental distribution (Portugal, France, Switzerland) and figured details of the nymph. He did not describe the nymph of *simile* as such, but gave a general description of a *Cloëon* nymph.

In 1914, Bengtsson (*Ent. Tidskr.* **37**:217-8) described *Cloëon praetextum* from Scandinavia, a species closely resembling *C. simile* Eaton in the adult but differing in the number of segments of the nymphal maxillary palpus and in the structure of the gills from the details of the nymph figured by Eaton as *simile*. Lestage (1917, *Ann. Biol. lacustre*, **8**:175-186) discussed the nymphs of the European species of *Cloëon* and gave a key to them, separating *dipterum* and *simile* on the relative proportions of the last and penultimate segments of the maxillary palpus, and the relative widths of the 7th gill. He gave figures of the maxilla, mandible, labium and labrum of *simile* nymph (taken from Eaton) and the 1st, 2nd and 7th gills, also attri-

buted to *simile* but taken from Vayssi  re. Now Vayssi  re's figures are however said to be of *dipterum* and Lestage himself (1921, *Larves nymphes aquat. ins. Eur.* pp. 251, 253), whilst still using Vayssi  re's figures to illustrate the gills of *simile*, quotes the originals in his references under *dipterum*. It is not clear whether Lestage had actually seen nymphs which he considered to be *simile* or whether his account of the species is based on Eaton's general account of a *Clo  on* nymph and his figures of *simile*. Schoenemund (1930, *Tierw. Deutschl.* 19:47-8) listed adults of *C. simile* from a number of localities but gives no localities for the nymph, nor did he give any illustrations of the latter in his key, his characters being taken from Lestage. Thus up to this time, the adult of *simile* was recognized, but the nymph was apparently known only from Eaton's figures, while Bengtsson had described a species very similar in the adult stage to *simile* but differing considerably in the nymph.

In 1949 Macan (*Ent. mon. Mag.* 85:224, figs. 1, 2, 4) figured and described as *simile* (from British material) nymphs which differed noticeably in various respects from the nymph figured by Eaton. Adults bred from these nymphs were similar in all respects to *simile*. The maxillary palpus had only 2 (not 3) segments, the apical margin of the terminal segment of the labial palpus was more obliquely truncate and less sinuous, the upper lamella of the gills was smaller and the apices of the lower lamellae more pointed. Macan did not comment on these discrepancies from Eaton's figures in his paper (although we had discussed them in correspondence), merely acknowledging that I had identified some of his adult material and had drawn his attention to the fact that certain species had two-segmented maxillary palpi. Macan's figures much more closely resemble the nymph of Bengtsson's *C. praetextum* than Eaton's *simile*.

We are thus faced with the confused situation in which, from British material (the type-country of *simile*), two quite different nymphs have been described as *simile*. Have we possibly two species in Britain, closely resembling each other as adults but differing widely as nymphs, or has an error in identification occurred? When Dr. Macan was preparing his paper on the nymphs of *Clo  on*, I searched our collections for nymphal material of *C. simile* determined by Eaton and found two sets of small tubes, each set containing individual, dissected mouth-parts of nymphs and labelled by Eaton '*C. simile*', and a tube containing a complete nymph, also labelled *simile*. These dissections have now been mounted as microscope preparations, and were presumably dissected by Eaton as models for the illustrations to his big monograph. One of these sets of dissected mouth-parts has a *three-segmented* maxillary palpus and the other a *two-segmented* palpus! The complete nymph also had a two-segmented palpus and the gills were of the pattern figured by Macan as a *simile*. I have recently compared Eaton's figures of the details of *simile* with dissections of *dipterum* and could find no appreciable difference, even the terminal

segment of the maxillary palpus being clearly shorter than the penultimate segment.

It is obvious from these facts that there has been some confusion in the labelling of Eaton's collection and that he either gave his artist dissections of *dipterum* which had been wrongly labelled as *simile*, or that he intended that most of the details of the *Cloëon* nymph should represent the common species *dipterum*, but by an oversight they were attributed to *simile*. A third possibility is that he did not fully appreciate the distinctions between the nymphs of the various species of *Cloëon*. I incline to the view that there were errors in the labelling of his collection, a view which gains support from the fact that the whole nymph figured as *C. rufulum* on the same plate, clearly shows the gills to be bilamellate, with the upper lamella smaller than the lower, a character of *Cloëon simile* as figured by Macan. Until this view be disproved by breeding an adult of *simile* from a nymph of the *dipterum* pattern (three-segmented maxillary palpi, bilamellate gills with large upper lamella), I propose to continue to accept Macan's diagnosis of *simile* nymphs as correct. I do not however consider the situation as finally clarified and one purpose of these notes is to draw attention to the confusion existing on the plate dealing with *Cloëon* nymphs in Eaton's monograph, in the hope that further field work will be stimulated.

If my hypothesis of an error in labelling proves correct, Bengtsson's *C. praetextum* may possibly prove to be a synonym of *C. simile* Eaton. There are however slight differences in the shape of the gills of *simile* as figured by Macan and of *praetextum* as figured by Lestage (1917) under the name of *Procloëon* sp., which according to Bengtsson (1936, *Opusc. Ent.* 1:5) is his *C. praetextum*.

This paper affords an opportunity to comment on one other case of synonymy affecting British species of *Cloëon*.

Chloëon dimidiatum Lubbock

1863, *Trans. Linn. Soc. Lond.* 24:61-67, pls. 17-18; id., 1865, *op. cit.* 25:277-492, pls. 58-59.

Eaton (1870) identifies this with his interpretation of *C. rufulum* (Müller), which is now placed in the genus *Procloëon*. The species dealt with by Lubbock in his work on the development of the nymph (identified for him by F. Walker) cannot be Eaton's *C. rufulum*, since the figure of the ♂ hind leg shows the basal segment of the tarsus to be only about twice as long as the second segment, a character of *Cloëon*. In the figures of the nymph, the apex of the terminal segment of the labial palp is obliquely and sinuously truncate, the maxillary palpi are stated to have three segments and the gills are bilamellate. Furthermore, Lubbock says the nymphs are very common 'in our Kentish ponds', which would certainly not be true of Eaton's *Cloëon rufulum*, which is neither common in N.W. Kent nor an inhabitant

of ponds. I consider that Lubbock's insect was certainly *C. dipterum* (L.). It is interesting to note that in the British Museum (Nat. Hist.) copy of Walker's List of the Specimens of Neuropterous Insects in the Collection of the British Museum, 1853, there are manuscript annotations by Eaton (undated) and against *Cloëon dimidiatum* (p. 580 he has written '= dipterum'.

BOOK REVIEWS

Handbooks for the Identification of British Insects, Vol. I Part 10. Odonata, by F. C. Fraser. Revised and Reprinted, 1956 (Royal Entomological Society of London). Pp. 49. Price 10s.

In its original edition, this little volume appeared in 1949, as one of the fore-runners of a now well-established and deservedly popular series. To date, it still holds pride of place for wealth of illustration, and the fact that a reprinting has become necessary is sufficient indication of its general utility. The present edition is essentially a reprint, but the author has taken the opportunity to bring both introductory matter and keys up to date. A few new figures have been added and an annotated list of casual immigrant dragonflies, for which there are well-authenticated British records, is included, the latter being a most useful innovation.

For many students, the keys to adults and nymphs will form the most valuable portion of the work. These keys are based upon carefully chosen characters and, in general, they work well, although a few points (most of which have been carried over from the first edition) call for comment. Thus, in the key to males of *Coenagrion* (p. 28), *armatum*, surely the most characteristic of all our species, is separated in the last couplet! With slight rearrangement of the choice of characters, this could have been avoided. Then the statement (p. 34) that *Gomphus vulgatissimus* is 'confined to the southern counties, south of and including the Thames Valley' is untrue, for there are several well-known colonies of this species on the upper reaches of the river Severn. One is surprised to see (p. 38) that *Somatochlora alpestris* is still accorded a full place on the list, although the authenticity of the one supposedly British specimen is open to question; and there appears to be no reason for retaining the trinomial *Sympetrum striolatum striolatum* (p. 41) when no other subspecies is included in the work. Perhaps the only serious error to be found is that which concerns the genus *Aeshna* in the key to nymphs. Here *A. caerulea* is classified (p. 44) as having antennae with seven segments, whereas the correct number is six—a character which will serve to separate the species from all its allies in this fauna. This error could have been corrected had the opportunity to revise the keys been used more fully.

B. P. MOORE.

Proceedings and Transactions of the South London Entomological and Natural History Society. 1954-55 (Published May, 1956). pp. xl; 210. With 17 plates (1 coloured) and 39 text figs. Price £1.

The quality of this annual volume is always good and this issue is no exception.

Over the years it has become a repository for the records of most of the best lepidoptera taken in Britain by reason of its full and well illustrated report, in the Proceedings, of the exhibits at the Annual Exhibition of the Society. This celebrated exhibition has no equal anywhere, and the photographic records (by Mr. W. H. T. Tams) of the more remarkable insects make this volume of unique value to the collector.

The Transactions contain many fine papers, of which we have not sufficient space to do much more than mention by title.

The British Agromyzidae (Dipt.), by K. A. Spencer, incorporates a list of additions to and deletions from the British List, and an Interim List of British Species.

The Biology of Dragonflies, by A. E. Gardner, is an important paper of 36 pages, beautifully illustrated by 7 plates and 15 other figs. It also gives a good list of references.

Dr. B. P. Moore contributes a very fine quality paper, *An Introduction to the British Carabidae*, which is well calculated to catch the interest of any youngster wondering what line to take up in entomology.

F. D. Buck in his *Black and White Entomological Drawings for Reproduction* treats and illustrates the subject so well that it would be a service to entomology in general and entomological editors in particular to reprint this excellent paper for sale separately.

There is also a short but interesting paper by S. C. S. Brown on *Guests of British Ants* which gives some useful tips on collecting methods.

A much longer paper by S. R. Bowden on *Hybrids within the European Pieris napi L., Species-group* will be of interest mainly to geneticists.

The Proceedings contain the President's address, of which the most important part is *On the British Oecophoridae III*, illustrated by a coloured plate, and is a continuation of the series of papers on the British Microlepidoptera being issued by the Society. This part, by the President, S. N. A. Jacobs, is on the genus *Depressaria* and the coloured plate, which is beautifully executed, is by the author.

At One Pound there can be few better purchases for the amateur entomologist than this volume—but in any case, membership of this very vigorous Society is an even better investment (details of membership can be obtained from The Secretary of the Society at: 14 Rochester Row, London, S.W.1.).

THREE DAYS IN WALES, 1956

By J. R. LANGMAID

Some friends of mine in Shrewsbury having recently leased a week-end cottage in Cardiganshire, kindly invited me to stay with them and find out what kind of moths inhabited the area. The cottage is called 'Brwyno' (pronounced Bruno), which in itself conjured up a magic aura of mystery, and my expectations were great.

The day before we set out for 'Brwyno' from Shrewsbury we alternated between staring disconsolately out of the window at the rain pouring from an uniformly grey sky, and listening to the B.B.C. weather forecasts which were no less depressing. On the following day it was not actually raining although the sky was still grey, and we packed the car up with food, raincoats, gum-boots, and various apparatus to tempt the moths out of their hiding-places. It was 11 a.m. when we eventually set out on the 60-mile journey. Much to our delight the sun broke through soon after we had crossed the Welsh border, and after that it never looked back.

'Brwyno' is a disused farm-house made of grey stone and is situated about two miles from the nearest village up a valley road which was not really meant to take modern automobiles. It faces down the valley towards the Dovey estuary, and on the other three sides is surrounded by mountains. Thus, except when the wind comes directly up the valley, it is completely sheltered.

As 'Brwyno' has no electricity, we took the mercury vapour lamp down to the village shop—'Owen the Post'—and he very kindly offered to have it in his garden for the three nights we were there.

During the mornings and afternoons we explored the countryside, which ranged from heather and bilberry on the mountains to damp woods and meadows in the valley. On the first afternoon we were walking down the lane when somebody shouted 'here comes something'. I made a wild swipe into the air with my net, and saw that I had caught a beautiful fresh *Panaxia* (*Callimorpha*) *dominula*. Just as I was boxing it my eye caught sight of another sitting quietly on a thistle. We saw a few more during the course of the next few days, but they did not seem to be common.

'Owen the Post' had instructions to switch on the lamp at 10 p.m., and we at 'Brwyno' sugared some trees and posts, and put a Bialaddin out on a sheet. I don't know if the mountain sheep went round licking all the sugar from our posts, but we were disappointed to find merely a half-a-dozen common moths and a few earwigs. The Bialaddin proved equally unproductive, and we thought that the ghost which was reputed to haunt 'Brwyno' had cast a spell on the moths. The following morning we set off early to collect the trap from 'Owen the Post', and found Mr. Owen staring at the moths on and around the trap and on the white-washed wall of his

home, muttering 'Well I neffer!' Altogether the wall produced almost as many moths as the trap itself, and it was good to see *Notodonta anceps*, *Apatele alni*, and many *Stauropus fagi* sitting well within reach.

Of the moths in the trap, one of the commonest was *Mythimna turca*, all the specimens being quite fresh. Among the most interesting were a pair of *Tethea fluctuosa*, a single *Apalante menyanthidis*, and another *alni*.

Although none of the moths taken were excessively rare, many of them were interesting, and the glorious weather made the holiday perfect.

BOOK REVIEWS

Annual Review of Entomology. Volume 1. 1956. Annual Reviews, Inc. Stanford. Calif. Pp. ix, 466. Illustrated. Cloth. Price in G.B. £3.

This first Annual Review is published in co-operation with the Entomological Society of America. The chief editor is E. A. Steinhilber, and the editorial committee consists of a panel whose names are a guarantee for the high standard of this publication.

The importance of sifting and collating relevant information on various aspects of entomology and presenting it in concise form is self evident. The fact that in the present case each special subject has been reviewed by a pre-eminent authority gives this book an importance which will, we think, establish it and successive volumes in the series as essentials for anyone seeking basic information on the various branches of the science—an 'Entomology without tears' in fact (and how many tears are shed each year over the time-wasting but essential bibliographical research which is necessary in almost every branch of entomology!). Each year that passes makes more urgent the need for summaries of accumulated knowledge—especially in fields such as insect biochemistry, where information is published largely in publications not mainly entomological.

The stress in this first volume is very largely on applied entomology, and there is little doubt that the most crying need for concise and easily available information on modern advances is in this direction, where so much time can be saved the professional engaged on practical problems.

In each case the summaries of the literature on the individual subjects are followed by extensive lists of the literature cited so that further reference for the specialist is made easy, whilst the authoritative resumé will, in many cases, make further reference unnecessary.

E.W.C.

The Eighth Plague, by Denys Rhoades. 1956. Pp. 280. Longmans, Green and Co., London, New York, Toronto. Price 13s. 6d.

A novel which will appeal to the entomologist. It tells the story of the men and women engaged in the relentless war against the Desert Locust.

The scene is set in an anonymous African territory, the characters being members of an anti-locust organization. Assisted by the most modern weapons, they fight a successful campaign (aided by fortunate metrological conditions at the critical moment) against the insects. Love, political intrigue and humour are blended in the correct proportions to make this entertaining reading.

A.E.G.

The South Essex Naturalist, 1956. The report and records of the South Essex Natural History Society. Twenty-first Anniversary Number 1934/1955. Pp. 76, 2 maps. Price 7s. 6d. Obtainable from The Secretary, S. T. Jermyn, 98 Western Road, Leigh-on-Sea, Essex.

The first seven pages are devoted to the Society's business and it is obvious from the Secretary's Report that the Society is a vigorous one with wide interests. The history of the Society is outlined by H. C. Huggins, this followed by a paper by H. R. Tutt on the 'Status of Birds in the Rochford Hundred, 1955'. Over two hundred species are listed together with a brief note on their status and other notes of interest.

Of most interest to our readers will be the paper by H. C. Huggins on 'Lepidoptera of the Rochford Hundred'. The groups dealt with include those covered in South's three volumes, Dr. Beirne's *British Pyralids and Plume Moths* and the Psychid group. Over six hundred and fifty species are enumerated together with the localities of the rarer species, their status and other facts of interest. S. T. Jermyn contributes an imposing list of eight hundred and thirty plants in his paper 'Botanical Notes and Records'.

The mammals are listed by H. C. Huggins and the fish and amphibians by E. J. Prockter. The volume concludes with a short paper by S. T. Jermyn, who defines the area worked by the Society, this illustrated by two maps.

The Society is fortunate in working an area so rich in local and interesting species; nevertheless, this good fortune is turned to good account by the diligence and hard work of its members, as is evident by the comprehensive and well-prepared lists supplied in this volume. It is to be hoped that the future will see lists of the other Orders of insects prepared in a comparable manner.

A.E.G.

The Observer's Book of Pond Life, by John Clegg. 1956. Pp. 128, 64 plates (32 in colour). Frederick Warne and Co. Ltd., London and New York. Price 5s.

This little volume measuring only $5\frac{3}{4}$ " x $4\frac{3}{4}$ " fits easily into the

pocket or haversack and will, no doubt, be a constant companion of the young naturalist or serious student interested in freshwater biology.

It is to be expected that in a book of these dimensions which covers such a wealth of organisms—Plants, Invertebrates and Vertebrates which inhabit our ponds and streams, that detailed descriptions and identification down to specific level are prohibited. Indeed, the author claims only that the plates, text and keys ensure identification to family and generic level, and he is to be commended on the choice of the representatives illustrated and described.

The black and white plates and line illustrations are excellent, the coloured plates generally good, except that on Plate 28, the Damsel-fly *Ischnura elegans* (Van der Lind.) is depicted as having a green instead of black abdomen. On Plate 31 the right-hand illustration shows a Damsel-fly nymph and not the imago as is suggested by the caption. The females of Odonata which practise endophytic oviposition deposit their eggs in, and not on, submerged plants and other objects.

A summary of the classification of the main groups of aquatic animals is provided, keys for the identification of selected groups, a list of works for further study and finally a general index. The fly-leaves are illustrated with a key to the commoner aquatic animals. The work is well produced and a worthy addition to an already popular series.

A.E.G.

The biology of the Heteroptera, by N. C. E. Miller. 1956. London, Leonard Hill (Books) Ltd. Pp. x + 162; 5 plates, numerous text figures. Price 30s.

For a decade before the war Mr. Miller was an entomologist in Malaya: his career was interrupted by some years in a Japanese internment camp. Subsequently he was for four years in Southern Rhodesia and for the past five years has been hemipterist to the Commonwealth Institute of Entomology, working in the British Museum (Nat. Hist.). He has had unrivalled opportunities for study of the Heteroptera, plant- and waterbugs, in both field and museum.

This is an unusual book. After an introduction six chapters are devoted to certain aspects of the Heteroptera, including nomenclature, morphology and biology: the selection of topics is somewhat unbalanced and one of minor importance, the legs, given space out of all proportion to its importance. Finally, a hundred or so pages are taken up by a systematic account of families and subfamilies: the Reduviidae are given very full treatment, but the space allotted to such families as Notonectidae and Miridae is meagre.

The good points of this work are principally the author's own observations upon Reduviids and the useful—though at times erroneous—list of families and subfamilies. Elsewhere there are a number of fanciful interpretations, erroneous statements and a style of writing leading to ambiguity.

DENNIS LESTON.

A Silkmoth Rearer's Handbook. Vol. 12 'The Amateur Entomologists'. Second (revised) edition by W. J. B. Crotch, M.A., A.K.C., $8\frac{1}{2}'' \times 5\frac{1}{2}''$, 165 pp., two coloured plates, 24 photogravure plates and 27 text figures. Published by The Amateur Entomologists' Society, London, 1956. Price 17s. 6d.

The excellent work of the Amateur Entomologists' Society in the publication of their first edition of 'A Silkmoth Rearer's Handbook' has made the publication of a revised edition an eagerly awaited event. The second edition, published in September, is something of a disappointment, despite the very welcome addition of coloured plates and more black and white illustrations. In place of the old readable book there is a verbose style of writing punctuated with vague statements and comment purporting to be fact. The result is confusing and often misleading. The editor has not ensured that the information passing under his pen is up to date in the light of well-publicized scientific discoveries. The problems of diapause which are posed have already been solved by such workers as Way, Smith and Hopkins, Carroll Williams and A. D. Lees, whilst the temperature/activity relationship in these insects conforms to a well-known rule. *Bombyx mori*, synonymous with silk, has been excluded from the new edition on the grounds that it is not a Silkmoth, although it is admitted that this is also a misnomer for the *Saturniidae*. If the editor proposes to introduce questions of taxonomy into this amateur field he must expect to have many purists who will question his justification for including members of the *Ceratocampidae*. Despite Mr. Crotch's statement that he is following the nomenclature used in Seitz's 'Macrolepidoptera of the World', one is left with the impression that he and Dr. Seitz are often talking at cross-purposes.

The illustrations are good with the exception of a few badly posed moths and one coloured picture of a larva of *Philosamia ricini* Hutton, which is labelled '*Philosamia cynthia*'. Despite its shortcomings this book will be a great help to intending Silkmoth rearers as it is unique in bringing together information and experience collected by a group of hard-working amateurs who have specialized in the subject.

C. F. RIVERS.

MARGARONIA UNIONALIS (HUEB.) IN LONDON
(LEP: PYRAUSTIDAE)

I should like to report the capture of a male *M. unionalis* at Totteridge on the night of October, 3rd-4th, 1956. The night was clear and cold with a dawn temperature 38 deg. F., and probably slight ground frost.

8 Southway,
Totteridge, N.20.

R. I. LORIMER.

MOTHS ON THE SHETLAND MAINLAND—1956

In case the idea still prevails that you must go to Unst to collect *Apamea exulis*, I would like to place on record an encounter with this species on the Mainland (i.e. the main island) of the Shetland Islands.

I stayed for a week on a family holiday (not a collecting expedition) at Mangaster in the northern part of the island during August of this year, and on the 16th and 17th I sugared the roadside telegraph poles. The weather was windy and cold, but a fair number of moths attended, including *exulis*, of which I took a series of seven. At least as many more worn specimens were seen and left, and only two of my series are really fresh.

Other visitors to the sugar were *Apamea monoglypha* (abundant and mainly very dark), *Amathes glareosa* (six taken, very bright and fresh, all var. *edda* except one), *Agrotis ipsilon* and *Triphaena pronuba* (single specimens). I also took, by other means, *Apamea furva*, *Cerapteryx graminis* (very abundant), *Xanthorhoe munitata* and *Colostygia didymata*. An ornithologist friend who has visited Mangaster in June tells me that *Parasemia plantaginis* is common there, and the local description of an insect called the 'Peat Fly' leaves little doubt in my mind that the celebrated Shetland *H. humuli* could be obtained in quantity earlier in the year.

Perusal of Mr. Demuth's account of collecting in Shetland (*Ent. Gaz.*, 1 (2), 1950:89) raises two interesting points. Firstly he says that *exulis* rarely attends sugar before 1.0 a.m. B.S.T. Mine mostly arrived between 10.30 and 11.30, some of them five or ten minutes after I had put the sugar on. They were not shy and inclined to fly away, perhaps because they were hard put to it to hang on at all in the strong wind. The other point concerns *glareosa*. Mr. Demuth says that var. *edda* prevails at about 99 per cent in Unst, but at Spiggie, near the southern tip of the mainland, he found no *edda*, all the specimens being grey. Mangaster, where I took five *edda* and one grey moth, is 33 miles due north of Spiggie and about 24 south of Balta Sound in Unst. As evidence this is scanty and inconclusive, but it does suggest that records of catches of *glareosa* at different latitudes in the Shetlands might reveal a gradation of increasing *edda* and decreasing grey individuals from south to north.

The cottage where I stayed near Mangaster Voe is not generally available, but accommodation can be had at Brae, only two miles along the main road between Lerwick and Hillswick, south of the turning to Mangaster. Ten miles to the north is Ronas Hill, nearly 1,500 feet, and the highest in the islands; it might well be worth investigating.

M. W. F. TWEEDIE.

Houghton House,
Rye, Sussex.

BOOK REVIEW

The Ixodoidea of Canada, by J. D. Gregson, Unit of Veterinary & Medical Entomology, Kamloops, British Columbia. 1956, Canada Dept. of Agriculture (Publication 930), Ottawa, Ontario. Pp. 92, 215 line drawings and 7 maps. Price 50 cents.

J. D. Gregson is to be congratulated on the production of his monograph on the Canadian Ixodoidea. It is well up to the standard we have come to expect of Canadian entomological literature. In a country where tick-borne disease is not uncommon, at least in the wild life, there has long been the need for a comprehensive account of the group.

The Argasidae are represented in Canada by only six species. *Argas reflexus* (F.) and *A. persicus* (Oken) are both represented by single records from southern British Columbia (B.C.), the former from a blue bird's nest, the latter from a sparrow's nest. The genus *Argas* is not indigenous to the Americas and only these two species have been introduced. *Ornithodoros hermsi* Wheeler, Herms and Meyer from B.C. and *O. kellyi* Cooley and Kohls (recorded from Saskatchewan since the monograph went to press) are the only representatives of the genus *Ornithodoros*. The genus *Otobius* is represented by *O. megnini* (Duges), recorded from B.C. and *O. lagophilus* Cooley and Kohls from Southern Alberta. *O. megnini*, which was first taken in Canada in 1941 on a cat, was found on 60 per cent of the Rocky Mountain mule deer (*Odocoileus h. hemionus* Rafinesque) shot in the lower North Thompson valley in 1951.

Of the soft ticks, *O. hermsi* is the most important since it is the suspected vector of the human cases of relapsing fever which have been recorded from B.C. So far all the Canadian records are from occupied human habitations. No infected *O. hermsi* have been found as yet in Canada, but the species has been implicated in outbreaks of relapsing fever in the western United States.

The Ixodidae are represented by 23 species from four genera; *Dermacentor* (three species), *Rhipicephalus* (one species), *Haemaphysalis* (two species) and *Ixodes* (18 species).

Of the hard ticks, the Rocky Mountain wood tick *Dermacentor andersoni* Stiles is of greatest medical interest since it is primarily responsible for the occurrence of tick paralysis, Rocky Mountain Spotted fever and Colorado tick fever in Canada. Furthermore, in both Alberta and Saskatchewan, *D. andersoni* has been found naturally infected with *Pasteurella tularensis* (McCoy and Chapin), the causal organism of tularæmia. In the United States this species of Ixodid has been found infected with the rickettsia of Q. fever. Western equine encephalitis virus has been experimentally passed through two generations of *D. andersoni* and toxoplasmosis has been transmitted by this tick under laboratory conditions. It has also been shown capable of transmitting *Salmonella enteritides*. The distribu-

tions of *D. andersoni* and *D. variabilis* (Say) meet along a line running south through Central Saskatchewan and, although the two species have similar life cycles, hosts, and broad tolerance of climatic factors, there is virtually no overlap such as occurs in the United States. Jelleson and Gregson (1950) have noted that, although *andersoni* occurs on both sides of the Rockies, tick paralysis rarely occurs east of the divide. *D. andersoni* is less often a carrier of Rocky Mountain spotted fever on the western side of the range, at least in B.C. Although no morphological differences have been detected, Gregson suggests that the ticks from each side of the range may represent separate physiological races or sibling species.

D. andersoni also has been taken on more than 30 host species in Canada and appears to have the widest host specificity of Canadian ticks, feeding on a wide range of hosts during each instar. *D. albipictus* (Packard) and *O. megnini* are the only one-host species among the Canadian ticks, and six other species (*Otobius lagophilus*, *I. texanus* Banks, *I. hearlei* Gregson, *I. sculptus* Neumann, *I. soricis* Gregson and *I. marmotae* Cooley & Kohls) are host specific during the various instars. The remaining species feed either on a wide variety of hosts, e.g. *D. andersoni*, *I. angustus* Neumann and *H. leporis-palustris* (Packard) or on closely related hosts, e.g. *D. albipictus*. A host tick list, confined to Canadian records and complete to the end of 1953 is included, although here one may detect some discrepancies. Thus, *Otobius lagophilus* is noted on p. 19 as occurring on cottontail and jack rabbits from Southern Alberta, but in the host-tick list there is only a record from the white-tailed jack rabbit (*Lepus townsendii campestris* Hollister).

Each species of tick is described in turn, and the synonymy in the literature referring to Canadian records is dealt with fully. The hosts of each species are listed, together with (presumably all, although this is by no means clear) the Canadian locality records with details of dates of collection, hosts and collectors. The distribution of all species known to occur in Canada at the time of preparation of the monograph is illustrated in a series of seven maps. *R. sanguineus* (Latr.) is an introduced species and appears to be spreading in Eastern Canada.

A key to the species is provided and the author has very wisely defined the terms used and, where possible, avoided reference to hypostomal characters. Since the hypostome is so often pulled off ticks sent for identification, examination of the hypostome is often impossible, and Mr. Gregson's decision will be welcomed by those who have to identify Canadian ticks. Only practical use of the key will reveal any deficiencies, but it appears well constructed and two plates and 215 line drawings illustrate the taxonomic characters.

FERGUS J. O'ROURKE.

THE RECORDED DISTRIBUTION AND HOSTS OF SIPHONAPTERA IN BRITAIN

By F. G. A. M. SMIT

(*British Museum [Natural History], The Zoological Museum, Tring, Herts*)

This paper forms a supplement to the Siphonaptera volume in *Handbooks for the identification of British Insects*. (Vol. I, Part 16), published by the Royal Entomological Society of London. Since it was not possible to give extensive data about the distribution of fleas in that publication, fuller data and a bibliography had to be published separately.

The ultimate aim of identification is not merely to find the correct name for a given organism but to obtain further information about it. To assemble the published data on a given species or on the species of a given area is a most time-consuming task, but without such information the collector (especially a beginner) does not know whether it is worth while to publish the records of specimens he has collected; thus a number of interesting finds, which would enhance our knowledge, may not have been published. For instance, nothing is known of the flea-fauna of the Isle of Man; have fleas never been collected there?

The data here offered concern only the distribution and hosts of fleas; the meagre information available on their bionomics etc. is left out of consideration.

To make this paper as concise as possible, the distribution is given by counties; data about the exact localities will usually be found in the literature referred to. The figures after each county refer to the numbered items in the bibliography, while the marking of a county with an asterisk means that specimens from that county are in the Rothschild or British Museum collection of fleas at Tring and have been examined by me. The specimens in the Tring collection are all being recorded in the Catalogue of that collection (by G. H. E. Hopkins and M. Rothschild) (109); the Pulicidae have been published in Vol. 1 (1953), the Ischnopsyllidae in Vol. 2 (1956). Full data of British specimens of the remaining three families in the Tring collection will, it is hoped, be published in subsequent volumes.

The names of the counties and of the hosts are listed in alphabetical order. Islands are listed by their names, usually followed by (i), or (is) in the case of a group of islands.

Names of accidental hosts are in square brackets.

The bibliography is concerned mainly with papers containing county-records which came to my notice till June 1st 1956. Papers containing only general statements such as that a certain species occurs 'in England', are omitted.

Superfamily Pulicoidea
Family Pulicidae
Subfamily Pulicinae

Echidnophaga gallinacea (Westwood), 1875

Aves: *Motacilla alba*.

WALES: Skokholm (i) 256, 257.

Pulex irritans Linnaeus, 1758

Mammalia: *Homo sapiens*, *Meles meles*, *Sus scrofa domestica*, [*Apodemus sylvaticus*, *Canis familiaris*, *Equus caballus*, *Felis catus*, *Microtus agrestis*, *Mus musculus*, *Rattus norvegicus*, *Talpa europaea*, *Vulpes vulpes*]. Aves: [*Anas platyrhynchos*, *Scolopax rusticola*].

ENGLAND: Bedfordshire 268; Berkshire* 109, 113, 211; Cambridgeshire* 109, 151; Cheshire* 29, 31, 109; Cornwall* 54, 55, 60, 109, 267; Cumberland 29; Derbyshire 100, 115; Devonshire* 109; Dorset 57, 59; Durham 15; Essex* 13, 108, 109; Gloucestershire 50, 92; Hampshire* 13, 89, 109; Hertfordshire* 71, 95, 96, 109; Huntingdonshire* 109; Kent 27; Lancashire 16, 29, 31; London* 109; Middlesex* 109; Norfolk 19, 148, 167; Northumberland 15, 276; Nottinghamshire 46, 47; Oxfordshire* 83, 89, 105, 106, 109; Shropshire* 109; Somerset* 50, 51, 109, 222; Staffordshire* 43, 91, 109, 116; Suffolk 144, 146, 147, 148, 240; Surrey* 109; Sussex* 5, 45, 109, 112, 113, 211; Westmorland* 29, 109; Wight (i)* 109, 111, 141, Wiltshire* 109, 136; Yorkshire* 37, 103, 109, 278.

WALES: Glamorgan* 109, 133; Pembrokeshire* 109.

SCOTLAND: Aberdeenshire* 68, 109, 135, 285; Argyllshire* 109; Dumfriesshire* 109; Eigg (i) 118; Fifeshire 285; Inverness-shire* 109, 282; Kincardineshire* 109, 282; Lanarkshire 281; Lewis (i)* 109; Midlothian* 76, 78, 81, 102, 109, 238, 279; Perthshire* 109, 279; St. Kilda (i)* 77, 109, 279; Shetlands, Mainland (i)* 109, 282.

IRELAND: Antrim* 109; Cavan 157; Cork 152; Dublin* 109, 152, 154; Leitrim 152; North Bull (i) 163.

Subfamily Xenopsyllinae

Xenopsylla brasiliensis (Baker), 1904

Mammalia: 'rats'

WALES: Glamorgan* 109.

Xenopsylla cheopis (Rothschild), 1903

Mammalia: *Rattus norvegicus*, *Rattus rattus*, 'rats'.

ENGLAND: Devonshire* 98, 99, 109, 134, 196; Gloucestershire* 92, 109, 210; Lancashire 38, 149; London* 109, 204, 205; Norfolk*; Somerset 222; Yorkshire 133, 278.

WALES: Glamorgan* 109, 131, 132, 133, 221.

Subfamily Archaeopsyllinae

Archaeopsylla erinacei erinacei (Bouché), 1835

Mammalia: *Erinaceus europaeus*, [*Canis familiaris*, *Homo sapiens*, *Muscardinus avellanarius*, *Mustela nivalis*, *Rattus norvegicus*, *Vulpes vulpes*.]

ENGLAND: Bedfordshire 268; Buckinghamshire* 109; Cambridgeshire* 109; Cheshire 29, 31; Cornwall 54, 267; Cumberland 29; Devonshire 249; Dorset 57, 59; Durham 15; Gloucestershire 92; Hampshire* 109; Hertfordshire* 95, 96, 109, 269; Kent* 27, 109, 249; Lancashire 31; Leicestershire 161; London* 109; Middlesex* 109; Northamptonshire* 109; Northumberland 15; Nottinghamshire 47; Oxfordshire* 83, 105, 106, 109, 249; Somerset* 51, 109, 222; Suffolk* 109, 142, 144, 146, 148, 240; Surrey* 109; Sussex* 20, 109, 112; Warwickshire* 109; Westmorland 29; Wight (i)* 109, 111; Yorkshire* 37, 109, 278.

WALES: Denbighshire*; Glamorgan* 109, 133, 249.

SCOTLAND: Aberdeenshire 68; Dunbartonshire* 109; East Lothian* 109, 285; Kinross-shire* 109; Midlothian* 76, 81, 109, 282.

IRELAND: Antrim* 109; Cavan* 109; Clare* 109; Dublin 152, 154, 249; Roscommon 152.

Ctenocephalides canis (Curtis), 1826

Mammalia: *Canis familiaris*, *Vulpes vulpes*, [*Felis catus*, *Homo sapiens*, *Mus musculus*, *Mustela erminea*, *Mustela putorius furo*, *Myotis daubentonii*, *Rattus norvegicus*, *Rattus rattus*.]

ENGLAND: Cambridgeshire* 109; Cheshire 31; Cornwall* 54, 109, 267; Derbyshire 115; Devonshire* 109; Dorset 57, 59; Durham 15; Essex 13; Gloucestershire 50, 92; Hampshire* 109; Hertfordshire* 95, 96, 109; Kent 27; Lancashire 31, 149; London* 109; Middlesex* 109; Norfolk 19, 148, 167; Northumberland 15; Oxfordshire 83, 105, 106; Somerset* 50, 51, 109, 222; Staffordshire 43, 116; Suffolk 144, 146, 148, 240; Sussex* 109, 112; Wight (i)* 109, 111; Wiltshire 119, 136; Yorkshire 37, 278.

WALES: Glamorgan* 109, 132, 133.

SCOTLAND: Aberdeenshire 68, 135; Midlothian* 78, 79, 109, 279.

IRELAND: Antrim* 109; Dublin 153, 154.

Ctenocephalides felis felis (Bouché), 1835

Mammalia: *Felis catus*, [*Canis familiaris*, *Homo sapiens*, *Oryctolagus cuniculus*, *Rattus norvegicus*, *Rattus rattus*]. Aves: [*Strix aluco*].

ENGLAND: Cambridgeshire* 109; Cheshire 31; Cornwall 54, 267; Dorset 57, 59; Durham 15; Essex* 109; Gloucestershire 50, 92; Hampshire* 109; Herefordshire 161; Hertfordshire* 95, 96,

109; Kent* 109; Lancashire 31; London* 109, 287; Middlesex* 109; Norfolk* 109; Northumberland 15; Oxfordshire* 83, 105, 106, 109, 181; Somerset 50, 51, 223; Sussex* 5, 45, 109, 112; Wight (i)* 109, 111; Yorkshire 37, 278.

WALES: Glamorgan* 132, 133.

SCOTLAND: Aberdeenshire 68; Midlothian 78, 81.

IRELAND: Antrim* 109; Dublin* 109, 152, 157.

Subfamily Spilopsyllinae

Spilopsyllus cuniculi (Dale), 1878

Mammalia: *Oryctolagus cuniculus*, [*Apodemus sylvaticus*, *Arvicola terrestris*, *Clethrionomys glareolus*, *Dama dama*, *Felis catus*, *Felis silvestris*, *Lepus europaeus*, *Lepus timidus*, *Mustela erminea*, *Mustela putorius*, *Sciurus carolinensis*, *Sorex araneus*, *Vulpes vulpes*].
Aves: [*Anas platyrhynchos*, *Athene noctua*, *Parus caeruleus*, *Perdix perdix*, *Phalacrocorax carbo*].

ENGLAND: Berkshire 9, 83, 85; Cheshire* 29, 31, 109; Cornwall 54, 267; Cumberland* 29, 109; Devonshire* 109; Dorset 57, 59; Durham 15; Gloucestershire 50, 85, 92, 245; Hampshire* 109; Herefordshire 161; Hertfordshire* 95, 96, 109, 114; Lancashire 16, 29, 31; Lundy (i)* 109; Norfolk* 109, 148; Northamptonshire* 109; Northumberland 15; Nottinghamshire 47; Oxfordshire 83, 85, 105, 106, 137, 138; Somerset* 51, 109, 222; Staffordshire* 109; Suffolk 130, 143, 144, 146, 148; Surrey* 109; Sussex* 20, 109, 112, 270; Warwickshire* 109; Westmorland 29; Wight (i)* 109, 111; Wiltshire 136; Yorkshire 37, 85, 216, 278.

WALES: Cardiganshire* 109; Carmarthenshire* 109; Glamorgan 133; Skomer (i)*.

SCOTLAND: Aberdeenshire* 3, 68, 109, 285; Angus* 109, 279; Argyllshire* 81, 109, 282; Arran (i)* 109; Canna (i) 48; Dumfriesshire* 109, 285; Dunbartonshire 129; Inverness-shire* 109, 285; Islay (i) 169; Kincardineshire* 109, 282, 285; Little Roe (i)* 109; Midlothian* 76, 109, 279, 282; Monach (is) 3; Perthshire* 109, 285; Ross and Cromarty* 109, 250, 285; Roxburghshire* 109, 285; Shetlands, Mainland (i)* 109, 285; Sutherland* 109, 285; Uist (i)* 109.

IRELAND: Donegal 156; Dublin* 109, 152, 153, 156; Galway* 109, 152, 154; Kilkenny 154; Leitrim* 109; Monaghan* 109; North Bull (i) 160, 163; Wicklow 152.

Ornithopsylla laetitiae Rothschild, 1908

Aves: *Fratercula arctica*, *Puffinus puffinus*, [*Hydrobates pelagicus*].

ENGLAND: Scilly Isles, Annet (i)* 109, 117, 201, 267; Scilly Isles 207.

WALES: Bardsey (i), 261, 264; Skokholm (i)* 109, 121, 122, 212; Skomer (i)* 109.

IRELAND: Great Skellig Rock (i) 156; Ireland's Eye (i)* 109, 156.

Superfamily Ceratophylloidea

Family Hystrichopsyllidae

Subfamily Hystrichopsyllinae

Hystrichopsylla talpae talpae (Curtis), 1826

* Mammalia: *Apodemus sylvaticus*, *Arvicola terrestris*, *Clethrionomys glareolus*, *Clethrionomys rufocanus*, *Microtus agrestis*, *Microtus orcadensis*, *Neomys fodiens*, *Sorex araneus*, *Sorex minutus*, *Talpa europaea*, [*Erinaceus europaeus*, *Meles meles*, *Mus musculus*, *Mustela putorius furo*, *Mustela nivalis*, *Rattus norvegicus*]. Aves: [*Anthus trivialis*].

ENGLAND: Berkshire* 9, 74, 75, 83, 86, 236; Buckinghamshire* 236; Cambridgeshire* 236, 261; Cheshire 29, 31, 42; Cornwall* 54, 82, 236, 267; Cumberland 29, 63; Derbyshire* 236; Devonshire* 236; Dorset 58, 59; Durham* 15, 236; Essex 44, 240; Gloucestershire 92, 236, 245; Hampshire* 236, 241, 274; Hertfordshire* 95, 96, 128, 130, 228, 236; Huntingdonshire* 236; Kent* 53, 236, 271, 272, 293; Lancashire 16, 29, 31; London* 56, 236; Middlesex* 236; Northamptonshire* 236; Northumberland 15, 24; Nottinghamshire 47; Osea (i)* 236; Oxfordshire* 63, 83, 105, 106, 236, 273, 275; Sheppey (i)* 236; Somerset 223; Suffolk 130, 144, 146, 148, 240; Surrey* 49, 66, 236; Sussex* 6, 18, 45, 112, 230, 236; Westmorland 29; Wight (i)* 111, 236; Yorkshire* 37, 103, 216, 220, 236, 278.

WALES: Glamorgan* 132, 133, 236; Merionethshire 63; Montgomeryshire 63; Skomer (i)* 236.

SCOTLAND: Aberdeenshire* 68, 236, 285; Angus 94; Argyllshire* 63, 94, 236; Caithness* 236, 285; East Lothian 80; Eigg (i) 118; Fifeshire 78, 80; Kincardineshire* 236, 285; Midlothian* 76, 79, 80, 236, 285; Morayshire 52; Peeblesshire 78, 80; Perthshire* 94, 162, 236, 285; Orkneys, Mainland (i)* 67, 236, 281; Raasay (i)* 236; Ross and Cromarty* 63, 236, 285; Roxburghshire* 63, 236; Sutherland* 236, 285; West Lothian* 80, 236; Wigtownshire* 236, 285.

IRELAND: Dublin 152, 159, 236, 249; Wicklow 152.

Typhloceras poppei Wagner, 1903

Mammalia: *Apodemus sylvaticus*, [*Microtus agrestis*, *Mus musculus*].

ENGLAND: Berkshire 83, 87, 105; Buckinghamshire* 193; Cornwall*; Devonshire*; Hampshire* 193; Hertfordshire* 96; Norfolk*; Oxfordshire 87; Scilly Isles, Tresco (i)*; Somerset*; Wight (i)* 111; Wiltshire* 193.

WALES: Glamorgan*.

SCOTLAND: Arran (i)*; Cumbrae (i)*; Fair Isle*; Lewis (i)* 72; Shetlands, Mainland (i)* 284, 285.

IRELAND: Clare (i) 152; Dublin 152, 249; North Bull (i)* 161, 163; Wicklow 152.

Subfamily Rhadinopsyllinae

Rhadinopsylla (Actenophthalmus) integella Jordan & Rothschild, 1921Mammalia: *Clethrionomys glareolus*, *Microtus agrestis*.

SCOTLAND: Angus* 94; Perthshire* 94.

Rhadinopsylla (Actenophthalmus) isacantha (Rothschild), 1907Mammalia: *Clethrionomys glareolus*, [*Talpa europaea*].

ENGLAND: Berkshire 86; Buckinghamshire*; Hampshire* 200, 209; Surrey* 209.

Rhadinopsylla (Actenophthalmus) pentacantha (Rothschild), 1897Mammalia: *Apodemus sylvaticus*, *Clethrionomys glareolus*, *Microtus agrestis*, *Talpa europaea*, [*Mustela erminea*, *Mustela nivalis*, *Mustela putorius*, *Rattus norvegicus*].

ENGLAND: Berkshire* 74, 75, 83, 86, 105; Buckinghamshire*; Cambridgeshire*; Cheshire 35; Cornwall* 267; Cumberland 29; Devonshire*; Durham 14, 15; Gloucestershire* 93; Hertfordshire* 95, 96, 183, 186; Leicestershire 161; Norfolk* 148; Northumberland 15; Oxfordshire 63; 106, 225; Somerset* 223; Staffordshire*; Suffolk 146, 240; Surrey*; Sussex* 230; Westmorland*; Wight (i)* 111; Yorkshire 37, 278.

WALES: Cardiganshire*; Glamorgan* 133; Montgomeryshire 63; Pembrokeshire*; Skomer (i)* 104.

SCOTLAND: Aberdeenshire* 68, 285; Arran (i)*; Fifeshire 78; Kincardineshire* 285; Midlothian* 279; Perthshire* 94, 162.

IRELAND: Dublin 161.

Subfamily Ctenophthalminae

Doratopsylla dasyncema dasyncema (Rothschild), 1897Mammalia: *Neomys fodiens*, *Sorex araneus*, *Sorex minutus*, [*Apodemus sylvaticus*, *Clethrionomys glareolus*, *Microtus agrestis*, *Rattus norvegicus*, *Talpa europaea*].

ENGLAND: Berkshire* 74, 75, 83, 105; Cornwall* 267; Cumberland 29; Devonshire*; Durham 14, 15; Gloucestershire 92; Hertfordshire* 95, 96, 184; Middlesex*; Northumberland 15; Oxfordshire 105, 106; Somerset* 223; Suffolk*; Surrey*; Sussex*; Wight (i)* 111.

WALES: Glamorgan*; Skomer (i) 104.

SCOTLAND: Aberdeenshire* 68, 285; Angus 94; Argyllshire* 94; Kincardineshire* 285; Lewis (i) 215; Midlothian* 279; Mull (i)*; Perthshire* 94.

Palaeopsylla kohauti Dampf, 1910Mammalia: *Talpa europaea*, [*Clethrionomys glareolus*].

ENGLAND: Cornwall 82; Nottinghamshire* 47, 209; Surrey* 209; Yorkshire 37, 278.

SCOTLAND: Aberdeenshire* 285; Morayshire* 206, 209; Perthshire*; Ross and Cromarty* 209, 285.

***Palaeopsylla minor minor* (Dale), 1878**

* Mammalia: *Talpa europaea*, [*Apodemus sylvaticus*, *Clethrionomys glareolus*, *Felis catus*, *Mustela erminea*, *Mustela nivalis*, *Mustela putorius*, *Sorex araneus*].

ENGLAND: Berkshire 9, 74; Buckinghamshire*; Cambridgeshire*; Cheshire* 29, 31; Cornwall* 82, 267; Cumberland 29; Dorset 57, 59; Durham 15; Gloucestershire* 92; Hampshire*; Hertfordshire* 95; Huntingdonshire*; Lancashire 16, 29, 31; Northumberland 15; Nottinghamshire 47; Oxfordshire 106; Shropshire*; Staffordshire*; Suffolk 146; Surrey*; Sussex* 22; Wight (i)* 111; Yorkshire* 278.

WALES: Cardiganshire*.

SCOTLAND: Aberdeenshire* 68, 285; Ayrshire* 285; Kincardineshire* 285; Midlothian 76†; Morayshire* 285; Perthshire*; Ross and Cromarty 285.

***Palaeopsylla soricis soricis* (Dale), 1878**

Mammalia: *Neomys fodiens*, *Sorex araneus*, *Sorex minutus*, [*Apodemus sylvaticus*, *Clethrionomys glareolus*, *Microtus agrestis*, *Mus musculus*, *Mustela erminea*, *Rattus norvegicus*, *Talpa europaea*.]

ENGLAND: Berkshire* 74, 75, 83, 105; Cornwall* 267; Devonshire*; Dorset 57; Durham 15; Hampshire*; Hertfordshire* 96; Kent*; Lancashire 36; Northamptonshire*; Osea (i)*; Oxfordshire 105, 106; Somerset* 223; Suffolk* 146, 240; Surrey*; Sussex*; Warwickshire*; Wight (i)* 111; Yorkshire* 216, 278.

WALES: Cardiganshire*; Glamorgan* 133.

SCOTLAND: Aberdeenshire* 68, 285; Angus 94; Argyleshire* 94; Caithness* 285; East Lothian*; Kincardineshire* 285; Orkneys, Mainland (is)*; Perthshire* 94, 285; Sutherland* 285.

IRELAND; Antrim*.

***Ctenophthalmus nobilis* s.l.**

Mammalia: *Apodemus flavicollis*, *Apodemus sylvaticus*, *Arvicola terrestris*, *Clethrionomys glareolus*, *Micromys minutus*, *Microtus agrestis*, *Microtus orcadensis*, [*Erinaceus europaeus*, *Felis catus*, *Mus musculus*, *Mustela erminea*, *Mustela nivalis*, *Mustela putorius*, *Neomys fodiens*, *Rattus norvegicus*, *Rattus rattus*, *Rhinolophus ferrumequinum*, *Sciurus carolinensis*, *Sorex araneus*, *Sorex minutus*, *Talpa europaea*]. Aves: [*Alauda arvensis*, *Corvus corone*, *Passer domesticus*, *Strix aluco*, *Turdus ericetorum*, *Uria aalge*].

†As 'gracilis Tasch. = *sorecis* Dale', but since the host is *Talpa europaea*, one may assume that the species was *P. m. minor* (Dale).

Ctenophthalmus nobilis nobilis (Rothschild), 1898

ENGLAND: Bedfordshire* 234; Berkshire* 74, 234; Cambridgeshire* 151, 170, 186, 234; Essex* 234; Hampshire* 234; Hertfordshire* 228, 234; Kent* 27, 85, 234; Norfolk* 234; Northamptonshire* 234; Osea (i)* 234; Oxfordshire* 234; Sheppey (i)* 234; Suffolk* 130, 144, 146, 148, 234; Surrey* 234; Sussex* 234; Isle of Wight* 234; Wiltshire* 234; Yorkshire* 234.

WALES: Pembrokeshire* 234.

SCOTLAND: Aberdeenshire* 234, 285; Orkneys, South Ronaldsay* 234, 279.

IRELAND: Donegal* 234; Dublin* 161, 234; North Bull (i)* 152, 160, 161, 163, 234; Wicklow* 152, 234.

Ctenophthalmus nobilis vulgaris Smit, 1955

ENGLAND: Cornwall* 82, 234, 267; Cumberland 29; Devonshire* 234; Gloucestershire* 92, 234, 249; Hertfordshire* 228, 234; Middlesex* 234; Oxfordshire* 234; Scilly Isles, Tresco (i)* 234; Sussex* 234; Westmorland* 29, 234.

WALES: Cardiganshire* 186, 234; Glamorgan* 234; Pembrokeshire* 234.

SCOTLAND: Aberdeenshire* 234; Angus 94; Argyllshire* 63, 94, 234, 282; Arran (i)* 234; Ayrshire 285; Caithness* 234, 285; Canna 48; Cumbræ* 234; Dunbartonshire 129; East Lothian* 78, 80, 81, 186, 217, 234, 279, 285; Fair Isle* 165, 234, 281; Invernessshire* 234; Islay (i)* 169, 234; Kincardineshire* 234; Lewis (i)* 72, 73, 215, 234; Lunga (i)* 234; Mull (i)* 234; Orkneys, Hoy (i)* 234; Orkneys, Mainland (i)* 67, 234, 279, 281; Pabbay (i)* 73, 234; Peeblesshire 80, 81; Perthshire* 81, 94, 162, 234, 285; Raasay (i) 94; Ross and Cromarty* 63, 234; Roxburghshire* 63; 234; Sanday (i)* 234, 285; Shapinsay (i)* 234, 285; Shetlands, Mainland (i) 234, 285; Sutherland* 234, 285; Wigtownshire* 234, 235.

IRELAND: Donegal* 234; Mayo* 234.

Ctenophthalmus nobilis nobilis \longleftrightarrow vulgaris

ENGLAND: Berkshire* 234; Buckinghamshire* 234; Hertfordshire* 228, 234; Middlesex* 234; Oxfordshire* 234; Somerset* 234; Staffordshire* 234; Surrey* 234; Sussex* 230, 234; Wight (i)* 111, 114, 186, 213, 234; Wiltshire* 234.

WALES: Glamorgan* 234; Skomer* (i) 234.

SCOTLAND: Aberdeenshire* 234, 285; Kincardineshire* 234.

Ctenophthalmus nobilis ssp.

(Not having seen male specimens of the following records, I cannot with certainty assign them to any of the three above mentioned categories.)

ENGLAND: Berkshire 9, 10, 74, 75, 83, 86; Cheshire 29, 31, 42; Dorset 61; Durham 15; Hampshire 130; Hertfordshire 95, 96, 114, 128, 130; Lancashire 16, 29, 31; London 287; Nottinghamshire 47; Oxfordshire 63, 105, 106, 276; Shropshire*; Somerset 222; Staffordshire*; Sussex 6, 112; Yorkshire 37, 103, 213, 278.

WALES: Glamorgan 132, 133; Merionethshire 63; Montgomeryshire 63.

SCOTLAND: Aberdeenshire 63, 68; Berwickshire 63, 281; Fifeshire 80, 81, 281, 282; Kincardineshire 282, 285; Midlothian 80, 81, 279, 282; Morayshire 285; West Lothian 80, 81.

IRELAND: Dublin 152, 154, 159, 249; Wexford 161.

Ctenophthalmus bisoctodentatus occidentalis Smit, 1956

Mammalia: *Talpa europaea*, [*Apodemus sylvaticus*, *Clethrionomys glareolus*, *Microtus agrestis*, *Mus musculus*, *Mustela erminea*, *Mustela nivalis*, *Rattus norvegicus*, *Sorex araneus*.] Aves: [*Erithacus rubecula*].

ENGLAND: Berkshire* 9, 10, 74, 114, 236; Buckinghamshire* 236; Cambridgeshire* 151, 188, 236; Cheshire 31; Cornwall 82, 267; Durham 15; Essex 240; Gloucestershire* 92, 236, 249; Hampshire* 236; Hertfordshire* 95, 96, 128, 236; Kent 27; Lancashire 31; Northamptonshire* 236; Oxfordshire* 105, 106, 236; Somerset* 236; Suffolk* 146, 148, 236, 240; Surrey* 236; Sussex* 188, 236; Wight (i)* 236; Yorkshire 37, 278.

WALES: Cardiganshire* 236; Glamorgan* 133, 236.

SCOTLAND: Aberdeenshire* 68, 236, 285; Angus 94; Fifeshire 78; Kincardineshire* 236, 285; Nairnshire 188, 285; Perthshire* 236; Sutherland* 236, 285.

Ctenophthalmus congener congener Rothschild, 1907

Mammalia: *Clethrionomys glareolus*.

ENGLAND: Hertfordshire* 228; Sussex* 230.

Family Ischnopsyllidae Subfamily Ischnopsyllinae

Ischnopsyllus (Ischnopsyllus) elongatus (Curtis), 1832

Mammalia: *Nyctalus noctula*, [*Eptesicus serotinus*].

ENGLAND: Cambridgeshire* 109, 186; Dorset 57, 59; Hampshire* 109; Hertfordshire* 95, 96, 109, 186; Kent* 109; Oxfordshire* 109; Somerset 224; Staffordshire* 109; Surrey* 109; Sussex* 6, 109, 112, 186; Yorkshire* 109, 277, 278.

Ischnopsyllus (Ischnopsyllus) intermedius (Rothschild), 1898

Mammalia: *Eptesicus serotinus*, *Nyctalus leisleri*, *Nyctalus noctula*.

ENGLAND: Cheshire* 109; Essex* 109; Hampshire* 109; Kent* 109, 186; Suffolk* 109; Sussex* 23, 109, 186; Wight (i)* 109, 111; Yorkshire* 109.

***Ischnopsyllus (Ischnopsyllus) octactenus* (Kolenati), 1856**

Mammalia: *Pipistrellus pipistrellus* [*Myotis mystacinus*, *Myotis nattereri*, *Nyctalus leisleri*].

ENGLAND: Berkshire* 109; Cambridgeshire* 109, 186; Cheshire* 31, 109; Devonshire 248; Gloucestershire* 92, 109; Hertfordshire* 95, 96, 109, 114, 186, 232; Lancashire 161; Middlesex* 109; Norfolk* 109; Northamptonshire* 109; Northumberland 15; Oxfordshire 105, 106; Somerset* 109, 222; Staffordshire* 109; Suffolk 97; Surrey* 109; Sussex* 109; Wight (i)* 109, 111, 233; Yorkshire* 109.

WALES: Glamorgan* 109, 133; Pembrokeshire* 109, 235; Radnorshire 248.

SCOTLAND: Ayrshire* 109; East Lothian 78; Inverness-shire* 109, 285; Kincardineshire* 109.

IRELAND: Antrim* 109; Cork 90; Down* 109; Dublin* 109; Fermanagh 152; Longford* 109; Louth 161; Waterford* 109; Wicklow 152, 161, 187.

***Ischnopsyllus (Ischnopsyllus) simplex simplex* Rothschild, 1906**

Mammalia: *Myotis mystacinus*, *Myotis nattereri*, [*Barbastella barbastellus*, *Myotis daubentoni*, *Plecotus auritus*, *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*].

ENGLAND: Berkshire* 109; Cheshire* 109; Gloucestershire* 92, 109; Hampshire* 109; Hertfordshire* 96, 109; Lancashire* 16, 29, 31, 109; Northumberland* 15, 109; Oxfordshire* 109; Somerset* 109, 222, 224; Staffordshire* 109; Sussex* 109; Warwickshire* 109; Wiltshire* 109; Yorkshire* 109.

WALES: Denbighshire* 109; Glamorgan* 109, 133; Merionethshire* 109.

IRELAND: Fermanagh 152.

***Ischnopsyllus (Hexactenopsylla) hexactenus* (Kolenati), 1856**

Mammalia: *Plecotus auritus*, [*Barbastella barbastellus*, *Myotis daubentoni*, *Myotis mystacinus*, *Myotis nattereri*]. Aves: [*Asio flammeus*].

ENGLAND: Berkshire 251; Cambridgeshire* 109; Cheshire* 32, 109; Derbyshire* 109; Essex* 109; Gloucestershire* 92, 109; Hampshire* 109; Hertfordshire* 95, 96, 109; Kent* 109; London* 109; Nottinghamshire 47; Oxfordshire* 83, 105, 106, 109; Shropshire* 109; Somerset 222; Sussex* 109; Wight (i)* 109, 111; Wiltshire* 109; Yorkshire* 109, 277, 278.

WALES: Glamorgan 133.

IRELAND: Antrim* 109; Cork 152; Down* 109; Dublin 157, 161; Longford* 109; Meath 152; Tyrone 152.

Nycteridopsylla eusarca Dampf, 1908Mammalia: *Nyctalus noctula*, [*Pipistrellus pipistrellus*].

ENGLAND: Cambridgeshire* 109, 203, 209, 214; Kent* 109, 209.

Nycteridopsylla longiceps Rothschild, 1908Mammalia: *Pipistrellus pipistrellus*, [*Plecotus auritus*, *Eptesicus serotinus*, *Myotis nattereri*.]

ENGLAND: Cornwall 267; Hertfordshire* 109, 202; Kent* 109, 202; Middlesex 182, 202, 203; Northamptonshire* 109; Oxfordshire* 105, 106, 109, 202; Somerset* 109, 202; Wight (i)* 109, 111.

IRELAND: Cork 90.

Family Leptopsyllidae
Subfamily Leptopsyllinae**Leptopsylla segnis** (Schönherr), 1811Mammalia: *Mus musculus*, *Rattus rattus*, [*Apodemus sylvaticus*, *Canis familiaris*, *Felis catus*, *Rattus norvegicus*, *Talpa europaea*].

ENGLAND: Buckinghamshire*; Cambridgeshire*; Cheshire* 30, 31; Cornwall 54, 267; Derbyshire 115; Devonshire* 134; Dorset 57, 59; Durham 15; Gloucestershire* 92, 231; Hertfordshire* 95, 96; Lancashire* 29, 31, 149; London* 287; Northumberland 15; Nottinghamshire 47; Oxfordshire 105, 106; Scilly Isles, Tresco (i)*; Somerset* 50, 51, 222; Staffordshire 43, 116; Suffolk* 146, 148, 240; Surrey*; Sussex* 6, 112; Wight (i)* 111; Yorkshire 133, 278.

WALES: Glamorgan 132, 133, 221.

SCOTLAND: Aberdeenshire 68; Midlothian* 78, 279; Orkneys, Mainland (i)* 101, 279; Shetlands, Mainland (i)* 285; Sutherland*.

IRELAND: Antrim*; Dublin* 152, 154, 158, 187, 249.

Peromyscopsylla silvatica spectabilis (Rothschild), 1898Mammalia: *Clethrionomys glareolus*, *Microtus agrestis*, [*Apodemus sylvaticus*, *Arvicola terrestris*, *Mustela erminea*, *Mustela nivalis*, *Sciurus carolinensis*, *Sorex araneus*, *Talpa europaea*].

ENGLAND: Berkshire* 9, 74; Buckinghamshire* 85, 209; Cumberland 29, 63; Durham* 14, 15; Gloucestershire 93; Hertfordshire* 95, 96; Northamptonshire*; Oxfordshire 106; Yorkshire 216.

SCOTLAND: Aberdeenshire* 68, 285; Angus 94; Argyllshire* 94; Arran (i)*; East Lothian* 184; Inverness-shire* 285; Kincardineshire* 285; Mull (i)*; Nairnshire* 285; Perthshire* 94, 285; Roxburghshire 63; Sutherland* 285.

Subfamily Amphisyllinae

Frontopsylla (Orfrontia) laeta (Jordan and Rothschild), 1920Aves: *Delichon urbica*.

SCOTLAND: Berwickshire* 226; Kincardineshire* 1, 69.

Family Ceratophyllidae
Subfamily Ceratophyllinae

Paraceras melis melis (Walker), 1856

Mammalia: *Meles meles*, [*Canis familiaris*, *Sciurus vulgaris*, *Vulpes vulpes*].

ENGLAND: Berkshire* 245; Cornwall* 54, 267; Devonshire*; Durham 15; Gloucestershire* 92, 245; Lancashire 38; Middlesex*; Northamptonshire*; Northumberland* 17; Oxfordshire* 83, 106, 249; Somerset*; Yorkshire* 15, 278.

WALES: Glamorgan 133; Monmouthshire*.

IRELAND: Antrim*; Cavan*; Cork*; Down*; Galway 154; Londonderry 110, 152, 249; Offaly 153.

Dasypsyllus gallinulae gallinulae (Dale), 1878

Aves: *Acrocephalus schoenobaenus*, *Aegithalos caudatus*, *Alauda arvensis*, *Anthus pratensis*, *Anthus spinoletta*, *Anthus trivialis*, *Asio otus*, *Carduelis flavirostris*, *Certhia familiaris*, *Chloris chloris*, *Cinclus cinclus*, *Coccothraustes coccothraustes*, *Columba livia*, *Columba livia domestica*, *Columba palumbus*, *Corvus corax*, *Corvus corone*, *Corvus frugilegus*, *Corvus monedula*, *Emberiza calandra*, *Emberiza cirrus*, *Emberiza citrinella*, *Emberiza schoeniclus*, *Erithacus rubecula*, *Fringilla arctica*, *Fringilla coelebs*, *Fulmarus glacialis*, *Gallinula chloropus*, *Garrulus glandarius*, *Hippolais icterina*, *Hirundo rustica*, *Jynx torquilla*, *Lagopus scoticus*, *Lanius collurio*, *Locustella naevia*, *Lullula arborea*, *Luscinia svecica*, *Motacilla alba*, *Motacilla cinerea*, *Muscicapa striata*, *Oenanthe oenanthe*, *Parus caeruleus*, *Parus major*, *Passer domesticus*, *Passer montanus*, *Phasianus colchicus*, *Phoenicurus phoenicurus*, *Phylloscopus collybita*, *Phylloscopus sibilatrix*, *Phylloscopus trochilis*, *Prunella modularis*, *Pyrrhula pyrrhula*, *Regulus regulus*, *Saxicola rubetra*, *Saxicola torquata*, *Scolopax rusticola*, *Sitta europaea*, *Sturnus vulgaris*, *Sylvia atricapilla*, *Sylvia borin*, *Sylvia communis*, *Sylvia curruca*, *Sylvia hortensis*, *Troglodytes troglodytes*, *Turdus ericetorum*, *Turdus merula*, *Turdus musicus*, *Turdus viscivorus*, *Vanellus vanellus*. Mammalia: [*Apodemus sylvaticus*, *Clethrionomys glareolus*, *Martes martes*, *Oryctolagus cuniculus*, *Sciurus carolinensis*, *Sciurus vulgaris*].

ENGLAND: Berkshire* 9, 10, 166, 175, 253; Buckinghamshire* 175; Cambridgeshire 261; Cheshire* 26, 29, 31, 175, 190; Cornwall* 175, 176, 267; Cumberland 29, 175; Derbyshire 253; Devonshire 175; Dorset 57; Durham* 15, 175; Essex* 175; Gloucestershire* 92, 175; Hampshire 175; Hertfordshire* 70, 96, 114, 175; London*; Norfolk*; Northamptonshire* 175; Northumberland* 15, 175; Oxfordshire* 85, 105, 106, 175, 253; Scilly Isles 175; Scilly Isles, St. Mary's (i)*; Scilly Isles, Tresco (i)* 175; Somerset* 175, 222, 223; Surrey* 175; Sussex 21; Wight (i)* 111, 175; Yorkshire 37, 278.

WALES: Bardsey (i) 261; Cardiganshire*; Flintshire* 175, 190; Glamorgan* 133, 175; Lundy (i) 261; 263; Skokholm (i)* 123, 175, 262.

SCOTLAND: Aberdeenshire 175; Arran (i)* 175; Ayrshire* 175, 282; Berwickshire* 175, 281; Dunbartonshire* 129, 175; Fair Isle* 7, 165, 290, 291; Fifeshire* 175, 281, 282, 285; Kincardineshire* 1, 69, 175, 282; Lanarkshire* 175, 285; Midlothian* 175, 279, 281, 282; Mull (i)*; North Uist* 175; Orkneys, Mainland (i)* 175, 279; Orkneys, South Ronaldsay (i)* 279; Perthshire* 175, 279, 285; Renfrewshire* 175, 282; Ross and Cromarty* 175, 285; St. Kilda (i)* 175; Shetlands, Foula (i)*; Shetlands, Mainland (i)* 174, 175, 285; Shetlands, Little Roe (i)* 175, 285; Shetlands, Uyea (i)* 175, 285; Sutherland* 175.

IRELAND: Aranmore (i)* 175; Donegal* 175; Dublin 152, 153; Galway 175; Inishtrahull (i) 161, 174; Kerry 156, 175; Sligo 175; Wicklow 161, 175.

***Malaraeus (Amalaraeus) penicilliger mustelae* (Dale), 1878**

Mammalia: *Clethrionomys glareolus*, *Clethrionomys rufocanus*, *Microtus agrestis*, *Microtus orcadensis*, [*Apodemus flavicollis*, *Apodemus sylvaticus*, *Arvicola terrestris*, *Homo sapiens*, *Mus musculus*, *Mustela erminea*, *Mustela nivalis*, *Rattus norvegicus*, *Sciurus carolinensis*, *Sorex araneus*, *Talpa europaea*, *Vulpes vulpes*]. Aves: [*Picus viridis*, *Strix aluco*].

ENGLAND: Berkshire* 9, 74, 75, 83, 85, 105; Buckinghamshire*; Cambridgeshire*; Cheshire 29, 31, 42; Cornwall* 267; Cumberland 29, 63; Devonshire*; Dorset 57; Durham 15; Gloucestershire* 93; Hampshire*; Hertfordshire* 95, 96, 120, 228; Lancashire 29, 31; Norfolk 146, 148; Northamptonshire*; Northumberland 15; Oxfordshire 63, 105, 106, 276; Somerset* 222; Staffordshire*; Suffolk*; Surrey*; Sussex* 230; Wight (i)* 111; Yorkshire 37, 216, 278.

WALES: Cardiganshire*; Glamorgan* 133; Merionethshire 63; Montgomeryshire 63; Pembrokeshire*; Skomer (i)* 104.

SCOTLAND: Aberdeenshire* 63, 68, 285; Angus 94; Argyllshire* 94; Arran (i)*; Berwickshire 63; East Lothian* 285; Kincardineshire* 285; Perthshire* 94, 285; Raasay (i)* 94; Ross and Cromarty 63; Sutherland* 285; North Uist (i) 279; Wigtownshire* 285; Orkneys, Mainland (i)* 67, 101, 279, 281; Orkneys, Sanday (i)* 285; Orkneys, South Ronaldsay (i) 279.

***Orchopeas howardi howardi* (Baker), 1895**

Mammalia: *Sciurus carolinensis* [*Apodemus sylvaticus*, *Clethrionomys glareolus*, *Glis glis*, *Sciurus vulgaris*, *Talpa europaea*]. Aves: [*Parus major*, *Pica pica*].

ENGLAND: Berkshire* 9, 64, 85, 175, 245; Buckinghamshire* 83, 85, 138, 218, 219, 265; Cheshire* 34, 85; Gloucestershire* 92;

Hampshire*; Hertfordshire* 85, 138, 265; London* 85; Northamptonshire*; Oxfordshire 83, 85, 106; Shropshire*; Surrey* 85, 249; Sussex*; Yorkshire* 85.

WALES: Glamorgan 85.

SCOTLAND: Aberdeenshire 2, 68.

IRELAND: Longford 84, 85.

***Callopsylla (Orneacus) waterstoni* (Jordan), 1925**

Aves: *Delichon urbica*.

SCOTLAND: Kincardineshire 1, 69, 282.

***Nosopsyllus fasciatus* (Bosc), 1800**

Mammalia: *Rattus norvegicus*, *Rattus rattus*, [*Apodemus flavicollis*, *Apodemus sylvaticus*, *Arvicola terrestris*, *Clethrionomys glareolus*, *Erinaceus europaeus*, *Microtus agrestis*, *Mus musculus*, *Muscardinus avellanarius*, *Mustela erminea*, *Mustela putorius furo*, *Mustela nivalis*, *Mustela putorius*, *Oryctolagus cuniculus*, *Sorex araneus*].
Aves: [*Delichon urbica*, *Troglodytes troglodytes*].

ENGLAND: Bedfordshire*; Berkshire* 9, 74, 75, 105; Buckinghamshire*; Cambridgeshire* 151; Cheshire*; Cornwall* 54, 267; Cumberland 29; Devonshire* 134; Dorset 57; Durham* 15; Essex* 240; Gloucestershire* 92; Hampshire* 130; Hertfordshire* 95, 96, 130; Huntingdonshire*; Kent* 27, 249; Lancashire* 29, 31, 149; London* 205, 287; Lundy (i)*; Middlesex*; Norfolk* 13, 139; Northamptonshire*; Northumberland*; Osea (i)*; Oxfordshire* 83, 88, 105, 106; Scilly Isles, Tresco (i)*; Shropshire*; Somerset* 222; Staffordshire*; Suffolk* 130, 144, 146, 148, 240; Surrey*; Sussex* 6, 112; Westmorland*; Wight (i)* 111; Wiltshire*; Yorkshire* 133, 278.

WALES: Glamorgan* 131, 132, 221, 249; Pembrokeshire*.

SCOTLAND: Aberdeenshire* 68, 285; Angus 94; Argyllshire* 282; Arran (i)* 175; Ayrshire* 282; East Lothian* 285; Fair Isle* 281; Fifeshire* 282, 285; Kincardineshire* 285; Lewis (i)* 72, 73, 215; May (i)*; Midlothian* 76, 279, 281; Mull (i)*; Orkneys, Mainland (i)* 279; Perthshire* 94, 285; Raasay*; Ross and Cromarty 285; St. Kilda (i)*; Sutherland*; West Lothian* 282; Wigtownshire* 285.

IRELAND: Antrim*; Dublin 152, 154; Mayo*; North Bull (i)* 152, 160, 161, 163; Wicklow 152.

***Nosopsyllus londiniensis* (Rothschild), 1903**

Mammalia: *Mus musculus*, *Rattus rattus*, [*Apodemus sylvaticus*, *Rattus norvegicus*].

ENGLAND: Gloucestershire* 92, 231; Kent* 209, 231; Lancashire 33, 149, 231; London* 192, 209, 231; Sussex* 231; Wight (i)*.

WALES: Glamorgan* 132, 231.

SCOTLAND: Aberdeenshire* 68, 209, 231.

Nosopsyllus fasciatus \leftarrow **londiniensis** \rightarrow

WALES: Glamorgan*.

Tarsopsylla octodecimdentata octodecimdentata (Kolenati), 1863Mammalia: *Sciurus vulgaris*.

SCOTLAND: Aberdeenshire 2; Perthshire* 229.

Megabothris rectangulatus (Wahlgren), 1903Mammalia: *Clethrionomys glareolus*, *Microtus agrestis*.

ENGLAND: Devonshire*.

SCOTLAND: Aberdeenshire* 68; Angus 94; Argyllshire* 94, 172; Perthshire* 94.

Megabothris turbidus (Rothschild), 1909Mammalia: *Apodemus sylvaticus*, *Clethrionomys glareolus*, *Microtus agrestis*, [*Mus musculus*, *Muscardinus avellanarius*, *Mustela erminea*, *Mustela nivalis*, *Rattus norvegicus*, *Rhinolophus ferrum-equinum*]. Aves: [*Erithacus rubecula*].

ENGLAND: Berkshire* 74, 75, 83, 86; Buckinghamshire*; Cornwall 267; Cumberland 29; Devonshire*; Durham 15; Essex*; Gloucestershire 92; Hertfordshire* 95, 96, 228; Lancashire 40; Northamptonshire*; Oxfordshire* 105, 106; Somerset* 222; Suffolk 240; Surrey*; Sussex* 230; Wight (i)* 111; Wiltshire*.

WALES: Cardiganshire*; Glamorgan* 133; Skomer (i)* 104.

The specimens of '*M. turbidus*' recorded from Ross and Cromarty, Scotland, (63) may have been *Malaraeus penicilliger mustelae*, since females of the latter species have very frequently been misdetermined as the former, probably because inadequate distinctions between them are given in Rothschild's Synopsis (1915); likewise, the record of *M. turbidus* from Argyllshire (172) is erroneous.**Megabothris walkeri** (Rothschild), 1902Mammalia: *Arvicola terrestris*, *Clethrionomys glareolus*, *Microtus agrestis*, [*Apodemus sylvaticus*, *Mus musculus*, *Mustela erminea*, *Mustela nivalis*, *Rattus norvegicus*, *Sciurus carolinensis*, *Sorex araneus*].

ENGLAND: Bedfordshire* 268; Berkshire* 74, 75, 83, 85, 105; Buckinghamshire* 191; Cheshire 29, 31, 42; Cornwall*; Cumberland 29, 63; Devonshire*; Durham 15; Essex 240; Gloucestershire* 92; Hertfordshire* 96, 114, 191; Kent* 191; Norfolk*; Northamptonshire* 191; Northumberland 15; Nottinghamshire 47; Oxfordshire* 63, 106; Sheppey (i)*; Shropshire*; Suffolk 240; Surrey*; Sussex* 191; Wight (i)* 111; Yorkshire* 37, 216, 278.

WALES: Glamorgan* 132, 133; Montgomeryshire 63.

SCOTLAND: Aberdeenshire 63, 285; Argyllshire* 94, 172; Berwickshire* 281; Midlothian 79; Mull (i)*; Roxburghshire*.

Monopsyllus sciurorum sciurorum (Schrank), 1803

Mammalia: *Sciurus vulgaris*, [*Arvicola terrestris*, *Clethrionomys glareolus*, *Glis glis*, *Martes martes*, *Meles meles*, *Muscardinus avellanarius*, *Mustela erminea*, *Mustela nivalis*, *Sciurus carolinensis*, *Sorex araneus*, *Vulpes vulpes*]. Aves: [*Accipiter nisus*, *Asio otus*, *Buteo buteo*, *Columba palumbus*, *Corvus monedula*, *Motacilla alba*, *Picus viridis*, *Strix aluco*, *Sturnus vulgaris*, *Turdus viscivorus*, *Tyto alba*.]

ENGLAND: Bedfordshire* ; Berkshire* 83, 85; Buckinghamshire 83, 85; Cambridgeshire* ; Cheshire* 39; Cornwall 54, 267; Cumberland 29; Derbyshire 115; Devonshire* ; Dorset* 57, 59; Durham 15; Essex* ; Gloucestershire 85, 92, 245, 249; Hampshire* ; Herefordshire 161; Hertfordshire* 85, 95, 96; Kent* 85, 219; London 85; Norfolk* 148; Northumberland 15; Nottinghamshire 47; Oxfordshire* 83, 85, 105, 106, 137, 138; Shropshire* ; Somerset* ; Staffordshire 43, 116; Suffolk* 144, 145, 146, 148; Surrey* 85, 249; Sussex* 6, 20, 112; Westmorland* 29; Wight (i)* 111; Wiltshire* 136; Yorkshire* 278.

WALES: Brecknockshire* ; Glamorgan* 133; Pembrokeshire* ; Radnorshire 249.

SCOTLAND: Aberdeenshire* 2, 68, 135, 285; Angus* ; East Lothian* 76, 81, 285; Fifeshire* 76, 285; Inverness-shire* ; Kincardineshire* 285; Midlothian* 76, 279, 282; Nairnshire 285; Perthshire* 229, 285; Ross and Cromarty* 285.

IRELAND: Dublin* 157; Galway* 152; Longford 161; Louth* ; Mayo 157, 161; Wicklow*.

Ceratophyllus gallinae gallinae (Schrank), 1803

Aves: *Accipiter nisus*, *Acrocephalus schoenobaenus*, *Aegithalos caudatus*, *Alauda arvensis*, *Anthus spinoletta*, *Anthus trivialis*, *Apus apus*, *Asio otus*, *Athene noctua*, *Carduelis cannabina*, *Carduelis carduelis*, *Carduelis flavirostris*, *Carduelis spinus*, *Certhia familiaris*, *Chloris chloris*, *Cinclus cinclus*, *Columba livia*, *Columba oenas*, *Columba palumbus*, *Corvus corax*, *Corvus corone*, *Corvus frugilegus*, *Corvus monedula*, *Delichon urbica*, *Dryobates major*, *Emberiza citrinella*, *Emberiza schoenichus*, *Erithacus rubecula*, *Falco columbarius*, *Fringilla coelebs*, *Fulmarus glacialis*, *Gallinula chloropus*, *Gallus domesticus*, *Garrulus glandarius*, *Hirundo rustica*, *Hydrobates pelagicus*, *Jynx torquilla*, *Lagopus scoticus*, *Locustella naevia*, *Motacilla alba*, *Muscicapa striata*, *Oenanthe oenanthe*, *Parus caeruleus*, *Parus major*, *Passer domesticus*, *Passer montanus*, *Perdix perdix*, *Phalacrocorax aristoteles*, *Phasianus colchicus*, *Phoenicurus ochrurus*, *Phoenicurus phoenicurus*, *Phylloscopus collybita*, *Phylloscopus sibilatrix*, *Phylloscopus trochilis*, *Pica pica*, *Picus viridis*, *Prunella modularis*, *Regulus regulus*, *Riparia riparia*, *Rissa tridactyla*, *Saxicola rubetra*, *Saxicola torquata*, *Sitta europaea*, *Stercorarius parasiticus*, *Strix aluco*, *Sturnus vulgaris*, *Sylvia borin*, *Sylvia com-*

munis, *Sylvia curruca*, *Sylvia nisoria*, *Troglodytes troglodytes*, *Turdus ericetorum*, *Turdus merula*, *Turdus viscivorus*, *Tyto alba*.
Mammalia: [*Apodemus sylvaticus*, *Canis familiaris*, *Clethrionomys glareolus*, *Felis catus*, *Homo sapiens*, *Martes martes*, *Microtus agrestis*, *Microtus orcadensis*, *Muscardinus avellanarius*, *Mustela erminea*, *Mustela putorius furo*, *Nyctalus noctula*, *Rattus norvegicus*, *Sciurus carolinensis*, *Sciurus vulgaris*].

ENGLAND: Bedfordshire* 175; Berkshire* 9, 10, 83, 85, 166, 175, 176, 253; Buckinghamshire* 85, 175, 292; Cambridgeshire* 175, 240; Cheshire* 25, 26, 29, 31, 175, 243; Cornwall* 54, 59, 175, 267; Cumberland* 29, 175, 176; Derbyshire* 115, 175; Devonshire* 175, 177; Dorset* 11, 57, 59, 175; Durham* 15, 175; Essex* 13, 175; Gloucestershire* 92, 175; Hampshire* 175; Herefordshire* 175; Hertfordshire* 70, 95, 96, 114, 173, 175, 253; Kent* 85, 261; Lancashire 29, 31, 175; Leicestershire* 175, 244; London* 175; Man (i) 288; Middlesex* 175; Norfolk* 175; Northamptonshire* 173, 175, 180; Northumberland* 15, 175; Nottinghamshire* 46, 47, 175; Oxfordshire* 28, 83, 85, 105, 106, 137, 138, 175, 253, 276; Scilly Isles 175; Scilly Isles, St. Mary's* 175; Shropshire* 175; Somerset* 51, 175, 222, 253; Staffordshire* 43, 116, 175; Suffolk* 144, 146, 148, 175, 240; Surrey* 175, 292; Sussex* 6, 112, 175, 189; Westmorland* 29; Wight (i)* 111, 175; Wiltshire* 136, 175; Yorkshire* 37, 175, 261, 278.

WALES: Denbighshire 253; Flintshire 168; Glamorgan* 132, 175; Montgomeryshire 63; Radnorshire*; Skokholm (i) 262.

SCOTLAND: Aberdeenshire* 1, 175; Angus 94; Arran (i)* 175; Ayrshire* 175, 285; Berwickshire* 175, 279, 281; Canna (i) 48; Clackmannanshire* 175, 281; Dunbartonshire 129; East Lothian 78, 175, 282; Fair Isle* 7, 164, 165, 291; Fifeshire* 175, 281, 282; Kincardineshire* 69, 175, 282, 285; Lamba (i)* 175, 285; Lanarkshire* 175, 282; Lewis (i) 175; Little Roe (i)* 175, 285; May (i)* 261; Midlothian* 76, 79, 175, 279, 281, 282; Morayshire 175; Mull (i)* 175; North Uist (i) 175; Orkneys, Mainland (i)* 67, 175, 279; Orkneys, South Ronaldsay (i)* 279; Perthshire* 175, 285; Renfrewshire* 175, 282; Ross and Cromarty* 175, 246; Shetlands, Mainland (i)* 175, 285; Shetlands, Yell (i)* 175; South Uist (i)*.

IRELAND: Antrim* 175; Cork*; Dublin 152, 153, 154; Galway 152, 175; Kerry 175; Waterford 154.

***Ceratophyllus rossittensis rossittensis* Dampf, 1913**

Aves: *Corvus corone*, [*Accipiter nisus*, *Tyto alba*].

ENGLAND: Cumberland* 176; Hertfordshire*; Northamptonshire*.

Ceratophyllus g. gallinae* ↔ *rossittensis

ENGLAND: Hertfordshire*.

Ceratophyllus fringillae (Walker), 1856

Aves: *Passer domesticus*, *Sturnus vulgaris*, [*Aegithalos caudatus*, *Alauda arvensis*, *Anthus spinoletta*, *Apus apus*, *Corvus monedula*, *Delichon urbica*, *Fringilla coelebs*, *Hirundo rustica*, *Motacilla alba*, *Muscicapa striata*, *Parus caeruleus*, *Parus major*, *Pica pica*, *Prunella modularis*, *Strix aluco*, *Turdus ericetorum*, *Turdus merula*].
Mammalia: [*Felis catus*, *Homo sapiens*].

ENGLAND: Berkshire* 10, 166; Cambridgeshire 261; Cheshire 31; Cumberland 29; Dorset 57; Durham 15; Essex*; Gloucestershire 92; Herefordshire* 194; Hertfordshire* 96, 114, 173, 194; Lancashire 41; London*; Northamptonshire* 173, 175; Northumberland 15; Oxfordshire 105, 106, 253; Somerset 194; Staffordshire*; Sussex* 21; Wight (i) 111; Yorkshire 278.

SCOTLAND: Arran (i)*; Ayrshire 282; Berwickshire 282; East Lothian 78; Kincardineshire 282; Midlothian 282; Shetlands, Mainland (i) 285; West Lothian 78.

Ceratophyllus vagabundus insularis Rothschild, 1906

Aves: *Corvus monedula*, *Corvus corax*, *Corvus corone*, *Fratercula arctica*, *Fulmarus glacialis*, *Larus argentatus*, *Phalacrocorax aristoteles*, *Phalacrocorax carbo*, *Rissa tridactyla*, [*Athene noctua*, *Columba livia*, *Falco peregrinus*, *Gallus domesticus*, *Muscicapa striata*, *Pernis apivorus*, *Pica pica*, *Strix aluco*, *Turdus ericetorum*].

ENGLAND: Berkshire* 175, 198; Cornwall* 161, 175; Durham 14; Farne (is)* 15, 175; Herefordshire 161, 175; Hertfordshire*; Middlesex* 175, 286; Northamptonshire* 161, 175; Surrey*.

SCOTLAND: Aberdeenshire* 1, 175; Arran (i)*; Boreray (i)*; Canna (i) 48, 175; Kincardineshire* 1, 175, 282; May (i)* 175; Midlothian* 175, 279, 285; Orkneys, Mainland (i)*; Orkneys, South Ronaldsay (i)* 175, 279; Ross and Cromarty*; St. Kilda* 175, 279; Shetlands, Mainland (i)* 175.

IRELAND: Dublin 153, 175; Inishtrahull (i) 157, 175; Ireland's Eye (i) 156, 175; Kerry 156, 175; Lambay (i) 153, 161, 175; Sheep Island (i) 152, 175, 252.

Ceratophyllus rusticus Wagner, 1903

Aves: *Delichon urbica*, [*Columba palumbus*, *Hirundo rustica*].

ENGLAND: Berkshire*; Cambridgeshire 261; Cheshire* 32; Dorset* 57, 195; Durham* 14; Gloucestershire* 92; Hertfordshire* 173; Lancashire 32; Northamptonshire* 173; Northumberland 15; Nottinghamshire 47; Oxfordshire 106, 253, 261; Somerset 223; Wiltshire 173, 175.

SCOTLAND: Berwickshire* 282; Clackmannanshire*; Kincardineshire* 1, 69; Perthshire* 282.

Ceratophyllus hirundinis (Curtis), 1826

Aves: *Delichon urbica*, [*Columba livia*, *Hirundo rustica*]. Mammalia: [*Nyctalus noctula*].

ENGLAND: Berkshire* 65, 253; Buckinghamshire 292; Cambridgeshire 170; Cheshire* 31; Cumberland 29; Derbyshire 115; Dorset 57, 59; Durham* 15; Gloucestershire* 92; Hertfordshire* 95, 96, 173; Middlesex*; Norfolk 253; Northamptonshire* 173; Northumberland 15; Nottinghamshire 47; Oxfordshire 105, 106, 253; Somerset* 223; Staffordshire 43, 116; Suffolk 144, 146; Surrey 247, 253; Wight (i)* 111; Wiltshire 173, 175; Yorkshire 37, 278.

WALES: Glamorgan* 133.

SCOTLAND: Ayrshire* 285; Berwickshire* 281, 282; Clackmannanshire* 281; East Lothian* 282; Midlothian* 76, 279; Perthshire* 285.

IRELAND: Dublin 153.

Ceratophyllus farreni farreni Rothschild, 1905

Aves: *Delichon urbica*, [*Columba palumbus*].

ENGLAND: Berkshire*; Cheshire 32; Cornwall 267; Gloucestershire 92, 171; Hertfordshire* 173; Lancashire 32; Northamptonshire* 173; Northumberland 15; Nottinghamshire 47; Somerset* 223; Suffolk* 144, 146, 148, 197; Wight (i)* 111; Yorkshire 278.

WALES: Glamorgan* 133.

SCOTLAND: Aberdeenshire*; Ayrshire* 285; Berwickshire* 197, 279, 281, 282; Clackmannanshire* 281; East Lothian* 282; Kincardineshire* 1, 282; Midlothian* 79, 279; Perthshire* 285.

IRELAND: Dublin 153.

Ceratophyllus styx styx Rothschild, 1900

Aves: *Riparia riparia*.

ENGLAND: Dorset* 234; Essex* 234; Gloucestershire* 92, 234; Hampshire* 234; Hertfordshire* 234; Lancashire 234; London* 234; Norfolk* 19, 234; Suffolk 146, 148, 234; Surrey* 234; Sussex* 234.

Ceratophyllus styx jordani Smit, 1955

Aves: *Riparia riparia*, [*Cinclus cinclus*]. Mammalia: [*Clethrionomys glareolus*, *Sorex minutus*].

ENGLAND: Cheshire 234; Cumberland 29, 234; Durham 15, 234; Hampshire* 234; Hertfordshire* 234; Lancashire 234; Leicestershire 234; Norfolk 234; Northamptonshire* 234; Northumberland 15, 234; Nottinghamshire 47, 234; Sussex* 234; Yorkshire 234, 276, 278.

WALES: Glamorgan 133, 234; Pembrokeshire 234.

SCOTLAND: Aberdeenshire* 1, 68, 234; Angus* 94, 234; Berwickshire* 234; Fifeshire* 76, 78, 234, 282; Inverness-shire 175, 234;

Midlothian* 234, 279; Peeblesshire* 234; Perthshire* 234, 282, 283; Roxburghshire* 234; Sutherland* 234.

IRELAND: Dublin 234.

Ceratophyllus s. styx* \leftrightarrow *jordani

Aves: *Riparia riparia*.

ENGLAND: Gloucestershire* 92, 234; Hampshire* 234; Norfolk* 234; Oxfordshire 234.

***Ceratophyllus styx* ssp.**

(Not having seen specimens on which the following records are based, I cannot with certainty assign them to any of the three above mentioned categories).

Aves: *Riparia riparia*, [*Phoenicurus phoenicurus*].

ENGLAND: Berkshire 105; Cheshire 31, 175; Hertfordshire 96; Oxfordshire 105, 106, 276; Somerset 223, Sussex 20; Worcester-shire 254, 258, 266.

IRELAND: Limerick 161.

***Ceratophyllus columbae* (Gervais), 1844**

Aves: *Columba livia*, *Columba livia domestica*, [*Columba palumbus*, *Phalacrocorax aristoteles*, *Riparia riparia*].

ENGLAND: Dorset 57, 59; Gloucestershire* 92; Hertfordshire*; London* 253; Northamptonshire*; Northumberland 15; Yorkshire 278.

SCOTLAND: Berwickshire* 282; Kincardineshire* 1, 282; Mull (i) 175; Ross and Cromarty* 189, 285.

IRELAND: Dublin* 152, 154; Great Saltee (i) 161.

***Ceratophyllus garei* Rothschild, 1902**

Aves: *Alauda arvensis*, *Alectoris rufa*, *Anas acuta*, *Anas platyrhynchos*, *Anthus pratensis*, *Asio otus*, *Aythya fuligula*, *Calidris alpina*, *Capella gallinago*, *Carduelis cannabina*, *Carduelis carduelis*, *Charadrius hiaticula*, *Chloris chloris*, *Circus pygargus*, *Columba livia*, *Columba palumbus*, *Corvus corone*, *Emberiza calandra*, *Emberiza cirrus*, *Emberiza citrinella*, *Emberiza schoeniclus*, *Erithacus rubecula*, *Fringilla arctica*, *Fringilla coelebs*, *Gallinula chloropus*, *Hirundo rustica*, *Jynx torquilla*, *Lagopus scoticus*, *Larus argentatus*, *Larus canus*, *Larus fuscus*, *Larus marinus*, *Larus ridibundus*, *Locustella naevia*, *Melanitta nigra*, *Mergus serrator*, *Motacilla alba*, *Motacilla cinerea*, *Muscicapa striata*, *Oenanthe oenanthe*, *Panurus biarmicus*, *Passer domesticus*, *Perdix perdix*, *Phalacrocorax aristotelis*, *Phasianus colchicus*, *Pica pica*, *Prunella modularis*, *Saxicola rubetra*, *Scolopax rusticola*, *Somateria mollissima*, *Spatula clypeata*, *Ster-*

corarius parasiticus, *Sterna macrura*, *Sturnus vulgaris*, *Tringa totanus*, *Turdus ericetorum*, *Turdus merula*, *Turdus torquatus*, *Vanellus vanellus*. Mammalia: [*Apodemus sylvaticus*, *Arvicola terrestris*, *Mustela erminea*, *Mustela nivalis*].

ENGLAND: Bedfordshire* 175, 268; Berkshire* 10, 175; Cambridgeshire* 261; Cheshire* 29, 31; Cornwall 175, 267; Cumberland* 29, 175, 176; Derbyshire 176, 253; Durham 10, 15, 175; Essex* 175; Farne (is) 15; Foulness (i)* 175; Hampshire*; Hertfordshire* 70, 96, 175, 176, 191; Kent* 27, 175, 253; Lancashire* 31, 175; Norfolk* 175, 176; Northamptonshire* 175, 176; Northumberland 10; Nottinghamshire 47; Oxfordshire* 105, 106, 175; Somerset* 175; Suffolk*; Surrey 253; Sussex*; Wight (i)* 111, 175, 176; Yorkshire* 37, 175.

WALES: Carmarthenshire* 176; Flintshire*; Glamorgan*.

SCOTLAND: Berwickshire* 175, 281; Clackmannanshire*; East Lothian* 78, 175, 279, 282; Fair Isle* 176; Fifeshire* 175, 281, 282; Kincardineshire* 1, 175, 282; Kinross-shire 76; Lamba (i)* 175, 285; Midlothian* 76, 175, 279, 282; Orkneys, Mainland (i)* 175, 279; Orkneys, South Ronaldsay (i)* 279; Perthshire* 175, 285; Shetlands, Hascussay (i)* 175; Shetlands, Little Roe (i)* 175, 285; Shetlands, Mainland (i)* 175, 176, 285; Shetlands, Uyea (i)*; Tinga Skerrie (i)* 175, 285; Tiree (i)* 175.

IRELAND: Antrim* 152, 175, 253; Clare 152; North Bull (i) 156, 163.

***Ceratophyllus borealis* Rothschild, 1907**

Aves: *Acrocephalus schoenobaenus*, *Actitis hypoleucos*, *Alauda arvensis*, *Anthus obscurus*, *Anthus pratensis*, *Anthus spinoletta*, *Cinclus cinclus*, *Cuculus canorus*, *Delichon urbica*, *Fratercula arctica*, *Lanius excubitor*, *Larus argentatus*, *Luscinia svecica*, *Motacilla alba*, *Motacilla cinerea*, *Muscicapa hypoleuca*, *Oenanthe oenanthe*, *Phoenicurus phoenicurus*, *Phylloscopus trochilis*, *Saxicola rubetra*, *Somateria mollissima*, *Sterna macrura*, *Sturnus vulgaris*, *Sula bassana*, *Sylvia communis*, *Turdus merula*, *Turdus musicus*, *Turdus torquatus*.

ENGLAND: Cumberland* 176; Derbyshire 176, 253; Scilly Isles, St. Agnes (i) 267; Scilly Isles, Annet (i) 267; Scilly Isles, St. Mary's (i)* 174, 176.

WALES: Bardsey (i) 261; Carmarthenshire* 176; Skokholm (i) 176, 255, 257, 260, 262.

SCOTLAND: Berwickshire* 280; Fair Isle* 7, 164, 176, 289, 291; Kincardineshire 282; Midlothian* 176; St. Kilda (i)* 199; Shetlands, Mainland (i)* 176, 208, 285; Tinga Skerrie (i)* 285.

IRELAND: Great Blasket Isle 176; Inishtrahull (i)* 155, 157, 161, 176.

Ceratophyllus garei $\leftarrow \rightleftarrows$ **borealis**

Aves: *Anthus pratensis*, *Columba livia*, *Fulmarus glacialis*, *Motacilla cinerea*, *Oenanthe oenanthe*, *Saxicola rubetra*, *Turdus torquatus*.

ENGLAND: Cumberland 176.

WALES: Carmarthenshire 176.

SCOTLAND: Outer Hebrides, Heisker (i) 176; Shetlands, Little Roe (i) 176.

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BOOK REVIEW

Butterflies and Moths, with an introduction by A. Werner. 1956. 4to. pp. 175. 34 coloured plates. Cloth. London. Andre Deutsch. Price £3 3s. 0d.

In the July number last year (*Ent. Gaz.*:7:150) we reviewed *Fliegende Kleinodien* by J. H. Schuler. This present book is an amended, and in our view much improved, edition in the English language.

In the previous review we remarked on the great beauty of the plates and made a criticism concerning those plates on which insects were artificially posed against 'natural' backgrounds. We are glad to see that in the new edition the offending plates have been omitted. This reduces the number of coloured plates from 42 to 34 with great advantage to the production.

The English text is a great improvement on the original German.

A new dust jacket improves the eye-appeal and the price is very moderate for such a production, being lower than the original edition.

This is a fine gift book and is deserving of a heavy demand both from entomologists and the general public.

E.W.C.

ALL ABOUT PHOTOGRAPHING INSECTS, by George E. Hyde. Photo Guide No. 73. The Focal Press, London & New York. Price 2s.

It is often asked—Which comes first, the photographer or the naturalist? The answer is that usually the two interests develop independently and then are combined. A photographer who uses insects as his models merely because they make attractive subjects will not be very successful. He may produce good photographs but not good natural history photographs.

This small book should help to improve the standard of natural history photography, some of which in recent years has been far from good. No hard and fast rules can be made for insect photography; each photographer will naturally build up his own technique, but the short descriptions given here of apparatus and of methods will be of assistance to those who have never before attempted this type of photography. Some of the information, of purely photographic details, is perhaps out of place and could more aptly be included in other books in the series.

The use of ether and of temperature-control for the keeping still of lively specimens is described, but such control is to be deprecated unless the insect be one of those, like the cockroach and silver fish, of which the habits preclude their being photographed without such aid. The method of control should always be stated when the photograph is reproduced in print or is used for lecture purposes.

The book is illustrated with many good photographs by different photographers, including the author, and by clear and useful line drawings, though it is a pity that the sketch on page 27, to illustrate the photographing of 'an insect taking refreshment from a flower', depicts a dragonfly on a tulip.

S. BEAUFOY.

LOZOTAENIODES FORMOSANA FROL. (LEP: TORTRICIDAE)
IN MIDDLESEX

On 8th August, 1956, to my great surprise, I took from my Robinson pattern mercury vapour trap, in my garden here, a specimen of *L. formosana*. I was with Mr. R. W. Parfitt when he took the first British specimen, and although I have seen the insect since then in the New Forest (Hampshire) I had certainly never expected to see it in Middlesex. There must be a fair sprinkling of pine trees in the district, although they are certainly not very obvious, as I regularly take small numbers of pine-feeders each year.

E. W. CLASSEY.

Feltham, Middlesex.